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Gas v. Electricity for the Lighting of Buildings.

By an "ENGLISH EXPERT."

The time is a convenient one to consider the relative cost, hygienic value, convenience, reliability and safety of gas and electricity, as applied to the lighting of buildings. When the erection of a building has been decided on, to whatever class it may belong, one of the most important questions to be considered is the lighting thereof. Three courses are open to the owner: Gas, or electricity, or both. The claims of gas for preference are very strong, and they are summed up below without any prejudice against electricity. Only a few years ago the general public, and even experts, were under the impression that lighting by gas was doomed; but the invention of incandescent mantles, and their production in a practicable form and at a reasonable price, have not only given gas lighting a new lease of life, but has made it a most formidable competitor. So much so that there has been a great revulsion of feeling in favor of gas. In fact, in many cases gas has replaced electric lighting, which has to contend with the difficulty of heavy cost. Streets formerly lighted by electricity are now lighted by gas, and there is the remarkable case of the largest railway station in London, formerly lighted by electricity, but now lighted by incandescent gas, resulting in a saving of more than $5,300 annually.

The first question generally asked is: "What is the relative cost?" The essential points are candle power and the number of lighting hours; the greater the number of hours, the more favorable is the claim of gas. For the purpose of a proper comparison of costs, 1,000 candle power for 1,500 lighting hours spread over a year may be taken as a basis. There are many types of gas burners; the inverted mantle burners, of 25 or 75-candle power; the upright burners, of from 40 to 200 candle power, or clusters of either. They all use gas at ordinary pressure. Larger units of light are available by means of induced draught, or self-intensifying lamps of say 300 or more candle power, with special burners arranged to use gas under locally increased pressure, which yield a greater efficiency per cubic foot consumed than ordinary burners. In that way units of light up to 3,000-candle power are available. The maximum efficiencies of these various burners range from 23-candle power per cubic foot, in the upright burners, and 30-candle power in the inverted burners and self-intensifying lamps, up to 40-candle power per cubic foot in the high pressure burners. It is, of course, assumed that the burners are properly maintained, with sound mantles, and that they are under the care of competent workmen; the averege working efficiency should then be within 25 per cent. of the maximum, often much nearer.

The cost of 1,000-candle power for 1,500 hours, assuming gas to be available at 60 cents per 1,000 cubic feet, and assuming an average efficiency of 75 per cent., works out as follows, in a large English town, for the four different systems: A, inverted burners; B, upright burners; C, self-intensifying lamps; and, D, high pressure lamps:

A.—Inverted Burners.

Thirty-three 30 candle power burners consuming 1¼ cubic feet per hour each; would require 66,000 cubic feet of gas, at 60 cents	$39.60
For renewal of mantles, cost 56 cents yearly for each	18.48
	$58.08
Thirty-three by-passes at 90 cents	29.70
	$87.78

B.—Upright Burners.

Fifteen 66 candle power burners consuming 4 cubic feet per hour each, would require 90,000 cubic feet of gas, at 60 cents.	$54.00
For renewal of mantles, cost 56 cents yearly for each	8.40
	$62.40
Fifteen by-passes, at 90 cents each	13.50
	$75.90

C.—Self-Intensifying Lamps.

Four 250-candle power lamps, consuming 10 cubic feet per hour each, would require 60,000 cubic feet of gas at 60 cents.	$36.00
For renewal of mantles, cost $2.40 yearly for each	9.60
	$45.60
Four by-passes, at $1.74	6.96
	$52.56

D.—High Pressure Lamps.

Two 500-candle power lamps, consuming 11¼ cubic feet per hour each, would require 33,750 cubic feet of gas at 60 cents.	$20.25
For renewals of mantles, cost $3.60 yearly for each	7.20
	$27.45
Two by-passes, at $1.80	3.60
	$31.05

In each of the four schedules given above by-passes are included. When they are in use all the year round an additional quantity of

gas is required, approximating 1,500 cubic feet, costing 90 cents for ordinary upright and inverted burners, and about $1.80 for larger ones. Corresponding schedules to the above for electric lighting give the following results:

For electric lighting various types of lamps are available, including the flame and arc types and various forms of filament lamps.

They may have an average working efficiency of 4 to 5 watts per candle power for carbon filament lamps, and varying amounts, down to 0.33 watts per candle power for flame arc lamps. Assuming current to be 8 cents per unit, the cost of 1,000 candle power for 1,500 hours would be as follows for various types of lamps:

Glow Lamps.

Seventy 7-candle power glow lamps, requiring 30 watts each per hour, and thirty-six 14-candle power glow lamps, requiring 60 watts each hour; 6,390 units at 8 cents	$511.20
375 lamp renewals, at 24 cents	90.00
	$601.20

Metallic Filament Lamps.

Twenty 50-candle power metallic filament lamps, requiring 100 watts each per hour; 3,000 units, at 8 cents	$240.00
For renewals of lamps or portions, at $1.20 per lamp	24.00
	$264.00

Osram Lamps.

Forty 25 candle power metallic filament lamps requiring 35 watts each per hour, 2,100 units, at 8 cents	$168.00
Renewals, 80 at 72 cents	57.60
	$225.60

Carbon Arc Lamps.

Two 500 candle power arc lamps of the usual type, requiring 500 watts each per hour, 1,500 units at 8 cents	$120.00
Carbons and labor at 19.20	38.40
	$158.40

Flame Lamps.

One 1,500 candle power flame arc lamp, requiring 500 watts per hour, 500 units at 8 cents	$ 40.00
Carbons and labor	24.00
	$ 64 00

These amounts compare very unfavorably with those given above for gas. The metallic filament lamps cannot be used singly on circuit of high voltage; they have to be run in pairs, carefully matched to avoid trouble. They can, moreover, only be used vertically, and they are also very fragile. Different types of electric lamps are sometimes grouped, say glow lamps and osrams, half the lighting being obtained from each; the cost, then, of 1,000 candle power for 1,500 hours would range from $408 to $432. A combination of gas burners, say small inverted and large inverted incandescent would cost only $82.

It is obvious from these figures that incandescent gas lighting is far less costly than electrical lighting; the former ranging from one-third to one-fifth of the latter. With regard to convenience they may be said to be equal, as both can be turned on at a moment's notice. The by-pass on the gas burner enables it to be turned on by a switch, which can be placed at any desired point. These so called distance controls for gas, are quite as effective as those for electricity and several different systems are available. For public buildings, such as large halls, places of worship, railway stations and others, a system of distance-control from a central board, with, of course, a separate supply for the by-passes, can now be installed, giving in this respect the same convenience as for electric lighting. In the application of gas lighting to buildings, care must be taken to economise the same as in the use of electricity. Householders often use gas wastefully on account of its cheapness; a reliable comparison with a similar house electrically lighted cannot then be made.

The number of important buildings formerly lighted by electricity and now lighted by gas is very remarkable; in the case of one large English company no less than 5,000. The change is entirely due to the saving effected. In one case the lighting bill was reduced from $700 to $336, whilst the light obtained was superior; householders are also saved the trouble of attending to the arc lamps and cannot be inconvenienced by their lights suddenly going out. It is also noteworthy that the initial cost of installing the electric light is about double that of gas. The greater reliability of gas lighting is a very strong point in its favor; breakdowns in electrical lighting, although not frequent, are by no means unknown, consequently the cost of electrical lighting is often increased in public buildings, by the desirability of having a second independent supply.

The ground is now cleared for a consideration of the weak points (if any) in gas lighting. It is claimed that electrical lighting is preferable to gas lighting from the health point of view, and many exaggerated and highly colored statements have been made by advocates of the former. The combustion of gas necessitates the consumption of oxygen, and carbon dioxide and water are produced. On the other hand, the electric light is produced *in vacuo* and has no effect on the air; it is asserted, therefore, that the hygienic condition of a room in which gas is used must be worse than one lighted by electricity. As a matter of fact that is not the case, due to several causes. Referring to this point, a well-known scientist remarked: "I have in my mind a hall once lighted by gas, in which a large audience could with comfort sit through an hour's lecture, or through a 3-hours' dinner. The illumination was then changed to electricity, with the result that any large gathering within its walls leads to a state little short of asphyxiation." The factors which give this anomaly are important and interesting. The products given off during the process of respiration are carbon dioxide, water vapor and traces of organic matter; air which has been once breathed is unfit for further respiration. If in a room the carbon dioxide increases from the normal 3 or 4 parts in 10,000, to 20, the atmosphere becomes noticeably foul to anyone entering from the outer air. In all processes of ventilation, the factors that enable us to change the atmosphere are the air currents set up by alteration in temperature, and inter-diffusion between volumes of air at different temperatures; *and it is this which gives gas its great advantage as an illuminant over electric lighting.*

The air movements set up by gas lighting result in the removal of the carbon dioxide and its replacement by purer air; whilst the electric light leaves the air stagnant without any tendency to change. The combustion of 1 cubic foot of gas will use up 6 cubic feet of air; giving off approximately half a cubic foot of carbon dioxide and nearly ½ cubic foot of water vapor. Using an incandescent mantle, on an atmospheric burner, about 4 cubic feet of gas per hour are consumed, which gives 2 cubic feet of carbon dioxide. That would very soon suffice to raise the proportion of carbon dioxide above the sanitary limit; but, though everything be done to render a room as airtight as possible, the proportion of carbon dioxide will be found very greatly less than it should be by theory, due to the fact that alterations in the temperature of the air of the room, set up currents, which tend to change the atmosphere. It is important to note that carbon dioxide is considerably heavier than air. It is, however, like other gases, expanded by heat, and as the foul air coming from the lungs and containing some 5 per cent. of carbon dioxide has a temperature of 98° F., it at once rises to the ceiling, and the products of combustion from the gas burners, being at a still higher temperature, also rise, so that the foul air always centers at the top of the room. The foul air when cooled does not descend, but diffuses throughout the atmosphere of the room, in accordance with the well-know law of diffusion of gases. These gases make their way through the walls and ceiling, which are full of minute openings or pores, through which the gases diffuse with considerable rapidity. The result is that, even if the ventilation of the room has been neglected and no proper outlet has been arranged at the top for the escape of foul gases, diffusion through the ceiling and the walls in the upper part of the room provides so rapid an egress for the hot gases, that they have not time to mingle with the air in the lower portion of the room. With electric lighting there are no such differences of temperature to produce air movement in the room. The atmosphere, therefore, becomes unpleasant and the contrast with that of a gas lighted room is noticeable. The following illustrates the point:

Distribution of Carbon Dioxide in the Air of Dwelling Room, Containing 2,700 Cubic Feet, with Gas and Electric Incandescent Lighting.

Gas Lighting.—Two burners on pendent, each consuming 4 cubic feet of gas per hour, and yielding 140 candles:

	Carbon Dioxide Parts per 10,000.	Temperature Deg. F.
Outside air	3	61.0
Between joists of ceiling	6	66.0
Ceiling level	44	74.7
Breathing level	5	63.0

Electric Lighting.—Three 16 Candle Power Incandescent Lamps,

	Carbon Dioxide Parts per 10,000.	Temperature Degs. Fahr.
Outside air	3	61.0
Between joists of ceiling	4	61.5
Ceiling level	9	62.5
Breathing level	6	61.7

In the electric lighted room, as the foul air has not the same tendency to rise, it remains diffused throughout the whole of the atnosphere of the room, causing a more rapid fouling and injury to health. The opinion has been expressed by many experts that the use of the electric light is more harmful to the human eye than the use of incandescent gas. Whether the electric light emits rays injurious to the eye is at present a moot-point, but it is an every day experience that it has to be shaded, losing half its power, and so is doubled in cost, power for power. That is due to the very high intrinsic brilliancy of the source of light.

The human eye cannot, without effort, endure greater brilliancy in a source of light than about 5 candle power per square inch, entering directly or obliquely—that is about the intrinsic brilliancy of an argand gas burner. The incandescent gas mantle has an intrinsic brilliancy of about 20 candles per square inch and, therefore, requires a diffusing globe of about four times its area to yield a perfect light. Whilst the exceeding fine filament of a glow electric lamp has a brilliancy of from 300 to 500 candle power per square inch of surface, and the still finer metallic filament of the most recent lamps have a still greater brilliancy per square inch. It is because ths eye is absolutely incapable of receiving such a brilliant light on the retina that the diameter of the filament of an electric lamp appears to be so much greater than it really is; proving that the electric light overstrains the eye.

It may be granted by gas advocates that electric light has an advantage in so far that it can be placed in almost any position desired; immediately beneath the ceiling, around the cornice and in many other places where gas burners could not be advantageously or safely used; but there can be little doubt that many fires are due to faulty electric light wiring. The cost of installing electric lights is a serious consideration in the case of smaller houses. and inferior material and workmanship are by no means uncommon.

Efficiency Engineering in Small Coal Gas Works.

[A paper read by Mr. J. Peter Eastman, for the Twelfth Convention, Wisconsin Gas Association.]

Among my early lessons in the gas business was one that I memorized thoroughly. It was the question, "How much coal did your company buy, and how much money came back to the office?"

A man in charge of a small gas works has a great deal to do with how much money does come back to the office, and he must not only make his gas as cheaply as possible, but make the best possible market for his by-products. The only market that is under his control is that for coke. We were selling coke this last winter at $7.50 per ton with hard coal selling at $7.75 to $8, and think we are the originators of selling coke on a flat rate basis. In doing this, we looked over the heating plants in our business district, and found those best suited to burn coke. Our next step was to offer to the owner of the building, fuel, fireman service, and removal of ashes, all for the price that he had previously been paying for his coal alone. In most cases the economy to him would amount to about $100 per year in wages to the fireman and for removal of ashes. We could not afford to do this if we did not have to dispose of a certain amount of breeze each year. We generally manage to burn about 50 per cent. breeze on our heating contracts, and thereby make a market which nets us $3 per ton in the yard. We have developed our coke market, as to price, to such an extent that it makes no material difference to us whether or not we get a high yield per pound of coal carbonized; but, of course, we try to get neither too high nor too low a yield. We regulate our make of gas to a certain extent by our heats and not by our charges. We can do this at the rate of from 10 to 15 thousand a day, and as our send-out does not vary on the average more than that much, we find it works very nicely. We generally get a line on our send-out by taking that of the week previous and striking an average. We then figure out how much coal we will have to carbonize at such a yield per pound to give us the required volume of gas. About Wednesday, if we find our calculations are wrong, we add from 25 to 35 pounds to each of the retorts charged for the next day or two, and keep the make to our send-out. If that alone does not make the required volume of gas we increase our heats so as to get a higher yield per pound.

In order to operate this way a superintendent must know his benches thoroughly and know just how much coal he can carbonize in 24 hours. He will find that, for about 4 days of the week, his sendout will exceed his make, and in the other 3 days he will have to make up what he has lost. If, not knowing how much he can make in case of accident, he has not enough confidence in his benches, the way would be to keep the holder full all the time, but thereby lose the economy of regular and even charges. We are now carbonizing our coal in large charges; that is, large charges for 16 inches by 28 inches, by 9 feet retorts. We are getting very satisfactory results by charging 600 pounds, carbonizing it in from 8 to 9 hours. We have only been doing this for the past 2 months, but are surprised that we did not do it before. We are making a better gas, a denser and harder coke, and less breeze.

We watch our mouthpiece and bridge-pipe lids to see that there are no leaks, for any manager or superintendent would make haste to stop a leak in his distribution system as quickly as it was reported. On our bridge-pipe lids, we have gone so far as to put tar paper gaskets. We put a new one on each time the lid is opened, and in this way not only keep the front of the benches looking better, but save the tar and gas that would leak out.

The tendency is to install inferior benches in small works, because of their low price. Such benches have an insufficient amount of re-cuperation, and it is difficult to hold heats in them even with a waste of fuel. Nothing can be more uneconomical than a cheap coal gas bench. A waste of 1 per cent. of fuel, per ton of coal carbonized, is 120 pounds per day, or about 22 tons a year, worth about $110, as coke prices go. The life of a bench filling is about 3 years, and a loss of 1 per cent. of fuel per ton of coal carbonized is, therefore, $330. The difference in cost between inferior benches and good benches is at the most $200. We cannot, therefore, afford to build inferior benches even if they do only lose 1 per cent. of fuel. As a matter of fact the difference may run as high as 2 and even 4 per cent. per ton of coal carbonized, and besides that, there is an additional loss because the inferior bench is kept up to heat with difficulty.

Every small works should have a flue gas analyzing set, The more simple it is, the more it will be used. From Dr. Harrop's "Gas Works' Chemistry," the loss of fuel, according to the per cent. of CO_2, in the waste gases, is as follows:

Per cent. of CO_2.	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Loss of fuel.....	90	60	45	36	30	26	23	20	18	16	15	14	13	12

It is, therefore, easy to see, if you are not getting fairly good combustion, that you are losing from 10 to 15 per cent. of your bench fuel. Judging the condition of your combustion with the eye cannot be as accurate as the analyzing set. Another thing worthy of comment is the condition of the floor in the retort house. Is it smooth and clean, or full of humps and hollows? This affects the efficiency of the men working there. Good tools and good men go together, as likewise do poor tools and poor men. In all my experience I have never found a good man willing to work with poor tools for any length of time, as a good man will not stay where he cannot give an efficient day's work. Another point is the efficiency of cleanliness. Each year we give our works a thorough cleaning and painting, and find that it has a good effect upon the men. When they see things clean and bright, they take pride in doing their share to keep them that way. A good mechanic around a gas plant is essential. We have, therefore, moved our meter repair shop to the plant, and the foreman of the works does the meter repairing. We have on the average about 100 meters put through our shop every month. Fifty of these we oil, test and paint, and the other 50 we only test and paint. With this work and other things that come up at the works we are able to afford a good mechanic all the time, and have to charge only about one third of his time to manufacturing.

The average superintendent of a small gas company does not have opportunities of learning things that are commonplace to the superintendent of a large plant. It is, therefore, wise for him to keep widewake and never miss the chance of visiting and thoroughly inspecting other plants. No two superintendents run a plant alike, and, from visits to various places, he can gain knowledge of things which which will profit him. This has been my experience, and I am sure you will all find it as I have stated. No matter how small the thing learned may have been, Ifeel confident that, one-way-or-another, it has been of value, not only to myself but to the company that employs me.

The Improved Equipment Company has removed its quarters from the 15th floor of 60 Wall street to the 6th floor of the same handsome, modern office building. In this case a "coming down" means really "a going-up," from the rental point of view.

[Official Report.—Concluded from Page 378.]

FORTY-THIRD MEETING, NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

Held in Young's Hotel, Boston, Mass., Feb. 19 and 20.

Second Day—Morning Session.

The President—Our next paper is by Mr. R. F. Pierce, of the Welsbach Lighting Company, and to this interesting and well prepared communication we will now listen. Its title is

STIMULATING THE GAS LIGHTING BUSINESS.

Before going into the methods of selling gas for lighting, it is perhaps worth while to call attention to some of the reasons why the retention of present, and the gaining of future business, in this line is worth more than the attention to which it would be entitled upon the basis of immediate profits alone.

In the first place, gas lighting is the very best gas advertisement, and advertising is the life-blood of modern business. If you have 20,000 gas ranges connected in your town, no one outside the families of the 20,000 users ever sees or hears of them. Their usefulness is largely confined to holding existing business. The influence of gas lighting, however, is not restricted by the four walls which confine the appliance that produces it. The lighting of a building or a street is the one inescapable feature which cannot elude the eye. Unconsciously, the shopper mentally appraises the excellence (or otherwise) of illumination in any store that she may frequent, and the sum total of her impressions is either favorable or unfavorable. She is either convinced that it is good or that it is bad; that it is popular or that it is unpopular; that gas (for to her gas light typifies its manifold uses) is on the upgrade or is on the downgrade.

The impression that gas lighting is popular, satisfactory and up-to-date, confers to a great degree the same prestige upon its other uses. Analyze the popular vogue of electricity for lighting, cooking, warming the baby's bottle, ironing the weekly wash. Upon what does it mainly depend? Upon the notion that it is up-to-date, popular, and increasing in popularity. And what can so quickly and so surely create a similar appeal on behalf of gas, as the increasing expansion of gas lighting?

From the operating standpoint, the relinquishing of gas lighting business often results in a marked decrease in works economy. If the peak load of the gas company be the cooking load, any decrease in lighting output decreases the load factor and increases the period during which the plant lies idle (or comparatively so), while fixed charges go on just the same. Not long ago the general manager of a large combination plant told the writer that his gas lighting business had decreased to such a point that during 12 hours of the day his plant was practically idle, and that considerations of works economy, if nothing else, made it necessary for him to bend every energy toward the expansion of gas lighting business. And several other combination plant managers have voiced substantially the same opinions. Conditions are changing. The term "load-factor" is assuming almost the same importance in the gas field that it holds in the electrical field. The problem is not so much the sale of gas as selling it at the right times to keep every dollar invested in plant and distribution working as many hours per day as possible.

To the straight gas company, gas lighting business is of even more vital importance. The lighting peak is the bane of every electric central station. It demands investment for current generating capacity which can be used (for lighting) for only a few hours per day. During the balance of the day the plant is comparatively idle. Obviously any use of electricity which demands the use of current during the off-peak period is extremely attractive business. The cost of generating this current is merely the cost of coal under the boilers—analogous to the cost of gas in the holder. The lighting customer pays the entire fixed charges on plant and distribution. As a matter of fact, very few central stations derive much profit from residence lighting business. The average monthly bill is not greatly in excess of the fixed charges entailed by the customers demand requirements. Off-peak current sold at 1.5 to 2 cents per kilowatt hour is more profitable than lighting current sold at 10 cents. The real desirability of residence lighting business lies in the fact that it pays the fixed charges and permits the taking of off-peak business at an extremely low price and of competing in fields from which electricity would otherwise be debarred for economic reasons, and residence lighting business is welcomed and sought for this reason—it provides the sinews of war for further conquests. Every lighting customer lost to gas means just one more unprofitable customer to the electric central station—one more incentive for increasing activity in the off-peak load.

There is to-day about three or four times as much lighting done by gas as by electricity. Consider the peak of every electric central station multiplied by four without corresponding increase during the off-peak period, and you have the result of yielding the lighting field to electricity, four times the necessity for off-peak business to the electric central station. To-day the lighting peak and the evening cooking peak overlap, and electrical cooking devices are very expensive. The development of a heat-storage system on the fireless-cooking principle that would shift the evening cooking peak (or the body of it) a couple of hours earlier, would solve the first drawback, and progress may be expected to solve the latter. I do not mean to say that electric cooking competition is within sight. What I wish to emphasize is that business which in the hands of a competitor constitutes a powerful stimulus toward attacks on another portion of gas company business, is well worth making an exceptionally strong effort to hold.

Gas lighting is and will be for years to come the backbone of the gas business. From the standpoint of hourly gas consumption of individual appliances, lighting business naturally appears less attractive than some other loads, but upon the basis of revenue per meter per year, it will constitute at least half, and generally much more, of the revenue from houses fully piped for gas. There is in some quarters an opinion that gas lighting business is more difficult to obtain than domestic fuel business. This the writer is inclined very seriously to doubt. Testimony from the comparative increases in the two fields by individual companies is quite misleading. So much depends upon the relative expenditures of time and energy and advertising. A comparison of the proportion of dead services in houses piped for lighting, as against those piped for domestic fuel only, is an accurate indication. There are very few cities in which the proportion of "dead" services in fully piped houses is not much lower than in houses piped for fuel only. The restriction of gas piping to the kitchen limits the future use of gas to this one room, and absolutely cuts off the gas company from the opportunity of profiting by the development of gas using appliances designed for use in other rooms.

Perhaps the greatest problem before the gas industry to-day is the securing of adequate piping throughout new buildings. In many cases the percentage of fully piped new buildings is quite satisfactory; in others, very far from it. It is quite obvious that to a great extent the securing of piping throughout will depend to a great extent upon the popular opinion concerning the advantages of gas lighting, and for this reason, if for no other, gas lighting demands particular attention at this time. In order that the general public may hold a good opinion of gas lighting, it is necessary: First, that gas be furnished under such conditions that the customer may use gas for lighting with a maximum of satisfaction and a minimum of annoyance; second, that the installation be of such a character as to furnish adequate and comfortable illumination, and reflect credit upon gas lighting from an artistic standpoint; third, that the installation be maintained in a good condition and at high operating efficiency; fourth, that the public be educated into an appreciation of its benefits and advantages. The first consideration involves the furnishing of clean gas of uniform quality at substantially uniform pressure. A gas lamp is built around a mantle designed to consume a certain fixed quantity of gas of a certain and fixed calorific value. Any deviation from the gas pressure or specific gravity for which the burner is designed and adjusted, or any fouling of the orifice, will disturb the conditions necessary for obtaining highest efficiency and most satisfactory performance.

This is one of the prime causes of necessity for frequent maintenance, which constitutes a considerable proportion of the cost of furnishing gas lighting service. Where the atmosphere is fairly free from dirt and dust, a gas lamp, furnished with clean gas of uniform quality, at constant pressure, should not require more attention than an incandescent electric lamp. The deterioration of glassware through dust is about the same with both, and gas mantles of good quality deteriorate no more rapidly than the filaments of electric lamps. The writer has seen inverted gas lamps in residence service for 18 months, without a single adjustment, pilot outage, or attention of any sort, with no sensible deterioration in illuminating power. The duplication of this service is possible in any case where the foregoing considerations receive attention, and the air is reasonably clean, and striving toward this ideal of burner performance is precisely what is

needed to-day. Of course, the glassware should receive attention at much more frequent intervals, say every 3 or 4 months, or oftener during periods when insects are troublesome. Such attention should not, however, be necessary from the standpoint of the operating efficiency of the lamp itself. Another serious consequence of pressure and specific gravity variations is the difficulty of securing satisfactory pilot operation. A pilot adjusted to maintain its flame under the lowest pressure and highest specific gravity encountered, will be excessive in gas consumption at a higher pressure and lower specific gravity. What happens more frequently is that the pilot is adjusted at a pressure considerably above, or specific gravity considerably below, the minimum or maximum, respectively, and outage and consequent annoyance follows a change. In the average residence there is no reason why a pilot outage should occur from 1 year's end to another, and pilot service of this character renders the gas lamp equal to the electric lamp in convenience, with the additional advantage of furnishing at all times sufficient illumination to show the location of the lamp. I cannot emphasize too greatly the fact that building up of lighting business *must* inevitably start from the furnishing of gas under good conditions.

The lamp manufacturer cannot be expected to furnish a lamp that will compensate for changes in gas quality. It is a physical impossibility. The gas lamp is, as stated above, essentially a constant pressure and quality apparatus, just as the incandescent electric lamp is essentially a constant voltage apparatus. Both yield their highest efficiencies under one, and only one, condition of energy supply, and the maintaining of this condition constant, is the first and most vital concern. The other elements entering into the satisfactory performance of the lamps are no less a part of the lighting service rendered, than the gas consumed upon which the charged is based. If proper maintenance be not secured the net result is dissatisfaction and loss of business. Where it may be done, maintenance by the gas company is undoubtedly preferable to entrusting the care of lamps to the customer. This is by no means peculiar to gas lighting. Electric central stations also are realizing that the efficient performance of lighting installations demands better attention than they are apt to receive from the customer, and many central stations are installing maintenance systems involving the cleaning of lamps and reflectors every 2 or 3 months.

In a paper presented before the Pennsylvania Gas Association in 1912, Mr. J. E. Philbrick, of York, Pa., gave the results of an aggressive campaign for commercial gas lighting business, based upon a nominal maintenance charge, and including the furnishing of fixtures and piping free. The effectiveness of this campaign undoubtedly owes much to each of these features, but the low maintenance rate was certainly, in a large part, responsible for the gratifying results. York is a manufacturing town of about 40,000 inhabitants. From April 1, 1911, to February, 1912, gas lamps representing 3,943 mantles were installed, 198 being on combination fixtures (which were likewise furnished free) and 2,019 on fixtures for inverted lamps. Maintenance was charged at 50 cents per mantle per year, which entailed an actual loss of from 5 to 15 cents per mantle per year, depending upon the type of lamp in use. Seventy-five per cent. of the store lighting in York is now done by gas.

I recently inspected the lighting there and was particularly struck by the fact that, on combustion fixtures, the gas burners were nearly always in use. Most lamps being on maintenance, every gas lamp was operating perfectly, and every reflector was clean and attractive. Any casual observer who might happen to take notice of the lighting of stores in the best business section of the city would gain the impression that gas lighting was generally preferred by the merchants. I at least obtained the impression that the principal business district contained a greater proportion of good examples of gas lighting than I had ever seen before, and I cannot see how anyone else can escape a similar conclusion. The advertising value of such a condition is incalculable. Their lighting business accounted for an increased sendout of 11 million cubic feet during the past year, and the reduction in gas costs made possible by the increased sendout more than counterbalanced the losses on maintenance.

The proper design of lighting installations is second only to the continuous satisfactory performance of the appliance. The customer's estimate of gas lighting is based entirely on what he gets out of it. He demands flexibility, originality and artistic effect, and will inevitably acquire a prejudice against any system of illumination which impresses him as lacking in any or all of these requirements. Perhaps we may best approach this subject from a negative standpoint, by calling attention to the supposed shortcomings of gas lighting and showing how they may be eliminated. They may be enumerated as follows:

1. Lack of commercially available methods of remote control.
2. Vitiation of the air.
3. Heat.
4. Fixture discoloration.
5. Inartistic appearance.

That remote control is by no means such an essential feature as has been supposed is shown by the rapidly increasing use of pull-chain sockets with electric lamps. For residences, factories, business places etc., the public is beginning to appreciate that pull-chain control *at the lamp* (such as has been available for several years with gas lamps) is the most satisfactory system. The elimination of expensive wiring, and the possibility of controlling individual lamps at the lamps themselves, are the principal features of advantage, and remote control is perhaps more often a disadvantage than an advantage. Where remote control is desired, pneumatic control with pilot ignition is both inexpensive and satisfactory, if properly installed. Magnet valve control is somewhat more expensive but more flexible and entirely satisfactory. Where infrequent use of lamps makes pilot expense prohibitive (as in churches, etc.), jump-spark ignition is entirely satisfactory if properly installed and maintained, and the degree of skill required is by no means great. The most elementary electrical knowledge will suffice.

As regards vitiatiation of the air, there is undoubtedly much public sentiment adverse to gas lighting, based entirely upon fallacious arguments and erroneous premises. This subject was quite thoroughly covered by an article[1] published in the "Illuminating Engineer." Dr. Rideal conducted an impartial and exhaustive investigation on this subject; finding that, under all conditions of ventilation, the air in gas lighted rooms was equal to that in electrically lighted rooms, showing that gas lamps, as ordinarily used, were capable, through increasing circulation of air, of removing their own heat and products of combustion. CO_2 content, temperature and humidity at the breathing level were substantially the same in either case. In every instance the gaslighted rooms were much freer from bacteria and organic matter, and the efficiency of the eye under gas light was markedly higher than under electric light, due no doubt to the lower brilliancy of the light source. While electric lamps are often screened, the means taken are seldom adequate; and, under average conditions, it is not too much to say that gas lighting is decidedly more hygienic (as regards the eyes) than electric lighting. Taking the above statement regarding heat, in connection with the common knowledge that gas lighting installations are sometimes troublesome in this respect, might perhaps give the idea that the test conditions did not approach or represent practical conditions. This is not the case. While it is true that the average temperature at the breathing level in gas lighted rooms is not substantially higher than in rooms electrically lighted to the same intensity, it is true that gas lamps are frequently installed in such a way as to produce excessive temperatures in certain spots, and it is also true that gas lighting is much more frequently overdone in the matter of intensities than electric lighting. The heat that proves troublesome in gas lighting is the radiant heat; but the heat contained in the uprising products of combustion is absorbed by the ceiling or is carried out by ventilation. The radiant heat per candle power is the same with either gas or electric light. Radiant heat is distributed about a light source in substantially the same manner as the light itself. It is quite natural, therefore, that gas lamps of high power, giving a high candle power directly downward, should, when hung low, produce a much greater degree of discomfort than electric lamps of lower power hung high. The obvious correction for heat troubles where they exist in gas lighting installations is:

1. Avoid over-illumination.
2. Hang high candle power units as high as possible.
3. Where the lamps must be low, use low candle power units only.

Perhaps the most frequent cause of heat troubles is the use of units larger than necessary. It is quite common practice, to use an inverted lamp, consuming say 4 cubic feet of gas per hour, suspended immediately over a desk. This lamp is substantially equivalent to a 100-watt tungsten lamp in illuminating power. For the same purpose, a 25-watt tungsten lamp at most would be used. It is no wonder that the gas lamp so used produces an uncomfortable degree of heat.

1. I expected to be able to distribute to you here some copies of this booklet. ... express company failed to make delivery at the calculated time. I will, ... arrange it so that you will all receive copies, either by mail or otherwi... deals largely with conclusions based on the experiments of Dr. Rid...

Inartistic appearance is by no means a necessary feature of gas lighting, though it has, through neglect, become an exceedingly common one. Within reasonable limits any artistic effect obtainable in connection with electric lighting may be obtained with equal facility in connection with gas lighting. It does not follow that gas lamps may be placed in the same positions or locations as electric lamps; but, wherever an artistic effect is to be achieved, or an æsthetic purpose realized, it is nearly always possible satisfactorily to utilize gas lighting. Where artistic considerations are of importance, economy is always secondary, usually almost negligible. The advantage possessed by the inverted lamp, in the latter direction, is by no means sufficient to justify its use under any and all conditions. Residence fixtures are almost invariably such that the equipment of each tip, with the smallest-sized upright lamp obtainable, is quite sufficient to produce abundant illumination at reasonable expense. There are few, if any, rooms in the average residence where the employment of individual lamps consuming more than 2 cubic feet per hour is either necessary or advisable. When we consider that the most commonly used inverted lamp is about equivalent to a 100-watt tungsten lamp, while the most popular size of the latter type of lamp in residence use is 25 watts, it is easy to see why the smaller size consuming about 2 cubic feet per hour should be generally used for residence lighting. Ordinarily, residence fixtures have 3 or 4 tips. If all are equipped with inverted lamps of the usual type, the cost of operation is at least equal to that of adequate electric lighting, while if only one lamp be lighted the effect is, from an artistic standpoint, exceedingly unsatisfactory. On the other hand, the use of the smaller sizes of gas lamps, both upright and inverted, enables the user to secure both artistic appearance and economy.

During the past few years, two new systems of illumination have appeared in which the position of the light source is quite concealed. These are the indirect and semi-indirect systems. From the artistic standpoint the former has many serious drawbacks. It turns the room optically upside down, the plane of highest illumination being at the ceiling instead of near the floor. The absence of a visible light source is rather annoying, and the fixtures, being non-luminous, have no apparent excuse for existence. The semi-indirect system has every advantage of the indirect, with none of its disadvantages, and, if properly arranged, is capable of producing beautiful effects and unexcelled illumination. It will undoubtedly become very popular and may be made to contribute greatly to the expansion of gas lighting, to which it is peculiarly adapted, by reason of its comparatively low efficiency and the concealment of the lamp.

The lines of endeavor which may be profitably pursued in the development of gaslighting business depend upon local conditions to a great extent. The gas company is simply a merchant of gas, just as the department store is a merchant of almost everything, and the sale of gas differs in no essential particular from the sale of any other commodity. In fact, it may be said that nine-tenths of the troubles which beset the public service corporation are due to the inability to discern this essential. Wherever you find an aggressive, successful commercial department, you will find a wideawake, competent merchant. This fact is worth emphasizing, since we hear so much nowadays concerning the sale of service, as though it were something quite distinct and different from the sale of a commodity. Surely, we cannot regard the gas company as selling service in the same sense that the architect, consulting engineer, or physician sells service. Do we not really mean that, as a business expedient, to further the sale of gas, we give service, exactly as the department store delivers purchases and provides other conveniences for its patrons?

I am not sure but that a study of modern merchandising methods, as applied in their highest development (the department store) would not prove of more real value to the gas company manager than any paper, limited in scope and view, to the gas business; but in order to make it as practical as possible, I shall confine myself to the sale of gas for illumination as a merchandising proposition.

Stop the first 10 men you meet and ask each of them what feature in a commodity gives it the most value as a selling proposition, and nine will answer "economy." If you analyze any markedly successful selling endeavor, however, you will find that this answer bears about the same relation to the truth that the south pole bears to the north; it is as far away as it is possible to get. Select almost any commodity used by the masses, and, within reasonable limits, you will find that the particular brand enjoying the widest sale and greatest success is the highest in price. So that, while we may impress economy the mainspring of every purchasing activity, we are would otherded by many other motives and considerations, almost any one of which is of greater moment. The big factor in merchandising is "human nature." A successful selling campaign is simply an appeal to human nature by a man who "knows how." Before we can intelligently select goods to offer the buying public, or formulate a plan for selling them, we must know what the people want and how they prefer to be told about it. When a man provides lighting for his home, he is not impelled simply by a desire to illuminate it so that a certain amount of ocular labor may be performed, any more than he purchases chairs with a single eye to their ability to support his weight. He is concerned primarily with comfort to the eye and to the senses. Pouring light into a room, like water squirted from a hose, is precisely what he does not want. He is mainly concerned with whether or not the lighting fixtures add to or detract from the appearance of the room. He is also much concerned as to the comparisons that may be drawn between his home and that of his neighbor, and he will inevitably acquire a prejudice in favor of that system of illumination which appears most popular and up-to-date. If gas lighting calls to his mind ugly, antiquated fixtures, in cheap tenements redolent of strange culinary odors, he will not be very apt to favorably consider gas lighting, and economy will make a very weak appeal to him. The average American dislikes nothing else so much as the implication that he purchases certain things because of a desire to save money. He may have a natural impulse toward economy, but he seldom boasts about it. Frank and open thrift is a virtue that only the wealthy may afford without losing caste. This may be a very sad state of affairs. Probably it is; but the fact remains that we are dealing with existing facts, not ideals, and the reigning passion in the average man is to enjoy the luxuries and comforts that properly belong to the income he expects, or hopes to get, next year. The moral is obvious. In your display rooms do not confine your offerings to the grade of fixtures that your customers are apt to buy, but show them the kind they should buy. A $30 fixture will appear extravagantly expensive if it happens to be the highest priced one in the lot; but among a display running up to $150, it will appear extremely inexpensive. It has been the experience of every gas company that the display of fixtures of higher prices than the public would buy has resulted in increasing the average price of fixtures actually sold, by influencing the buyers toward the purchase of better grades. The same holds true with reference to glassware. The equipment of existing fixtures, with lamps and glassware of better appearance, is of equal importance with the sale of high grade fixtures. About two-thirds of the electric fixtures sold annually are combination fixtures. These represent connected capacity, needing only the provision of suitable gas burners to produce revenue for the gas company. It would pay, and pay well, for every gas company to place, free of charge, upon request, 2-foot, upright burners on every combination fixture in residences. This is really the logical thing to do, for the burner corresponds to the electric socket, as the mantle corresponds to the electric lamp. To place gas upon an equal footing with electricity, equal facilities should be provided for its use, and, if such facilities were provided, surely gas would be used in preference, if the consumer knows as much about the advantages of gas lighting as it is the gas company's business to tell him. The same line of argument holds concerning straight gas fixtures. Every gas fixture installed should be equipped with an incandescent burner. The open flame tip is not a revenue producer. It is a liability. It is the very best argument against gas lighting. It is more expensive means of lighting than the most inefficient electric lamp, and its wavering light is about as undesirable from the standpoint of eye comfort as can be imagined. A recent witness before the New York Bureau of Factory Inspection stated that its use should be prohibited by law on the latter grounds alone. From the standpoint of gas sales it is less desirable than the incandescent burner, for experience shows that the substitution of the latter for the open tip results in the use of more light and for longer periods, and an actual increase of yearly gas consumption. The tenants of rented houses, who form a large and constantly increasing proportion of our population, cannot be expected to cart about an assortment of lamps every time they set up their household gods in a new place.

The selling of gas for mercantile lighting is a slightly different proposition. Economy is of a little more importance, and for obvious reasons the inverted lamp is preferable. Competition is keener, and careful design to insure the efficient utilization of light is required. First of all the salesman, like any other salesman, should know enough about his product to give the customer intelligent information concerning its use. A salesman who lacks this knowledge

lighting business.

is about as well equipped for selling gas lighting as a legless man for running a race. Ample information on this subject is available for any salesman who desires it. If he does not get it, it is because he has no incentive to acquire it, and you alone can furnish the incentive. Let the salesman know that his position and advancement depend upon his proficiency in this line, and he will acquire it. A good way to get salesmen in the habit of acquiring methodical information concerning lighting systems is to require a report on each call, giving the dimensions of the lighted area, character of business conducted, conditions of sidewalls and ceilings, size and number of lamps, kind of reflectors or globes, and the watts per square foot, or cubic feet of gas per square foot of floor area. Furnish each salesman with a table showing the watts per square foot, and cubic feet per square foot required for different illuminations, and the degree of illumination required in different classes of service, and require him to work out the gas consumption adequate for the lighting of each store. He will soon acquire the habit of thinking in energy units and light units and learn to analyze each problem with the idea of obtaining an accurate solution. When he has learned to do this, he will naturally forsake his previous slipshod methods, and cease to make things easy for his electrical competitor. As a little knowledge begets a desire for more, he will soon acquire the habit of systematic study, which in itself will double his value to his employer.

There is not a sufficient appreciation of the wastefulness which usually accompanies carelessly or improperly designed lighting systems. Not long ago I was asked by a solicitor to look over a lighting layout, that he had prepared for a prospective customer who was most anxious to have a very brilliantly lighted store. The proposed layout would have produced about 6 times as much light as was amply sufficient. I recommended the substitution of single-mantle, inverted lamps for the 3-mantle arcs proposed, and the installation, in accordance with these recommendations, proved highly satisfactory in every respect. If the original plan had been followed it would have been an easy matter for the electrical salesman to have replaced it, at an actual decrease in operating cost, and no apparent decrease in illumination, for the eye is not sensible of increase of illumination greatly in excess of its normal requirements. The only way to avoid blunders of this sort is to demand careful consideration of every lighting problem by the solicitor, and the most effective way to secure this is to require a detailed report on the conditions and requirements for each customer, present and prospective.

The things most subject to criticism in gaslighting, as usually done, are the selection and location of lamps. The tendency is to use larger units than are either necessary or desirable, and to hang them too low. This may be prompted by the desire to secure easy maintenance, but it makes for poor light distribution and the aggravation of heat troubles.

The accompanying tables were designed to convey to the solicitor essential information for his guidance in planning simple installations, in a form so simple and intelligible that he could not possibly fail to use it properly. The only particular in which he is required to exercise judgment is in the selection of units and reflectors. The latter is quite simple, for investigation will generally indicate that the units available for any particular installation are few in number, and the choice among them consists mainly in selecting the one most nearly fulfilling theoretical requirements, giving due consideration to first cost, maintenance, etc Each solicitor should be encouraged to follow the procedure recommended, as closely as possible, and to make such a report upon the final installation as will enable his superior to judge how closely the theoretical requirements have been approximated, and the reasons (if any) for wide divergences there from.

Perhaps there is no other factor so important in establishing the prestige of gas lighting as advertising, the real advertising that appeals to the more powerful motives that influence the buyer, as contrasted against the colorless, unconvincing sort of "copy" that confines itself to mere statement of economy of gas lighting and the excellence of the company's service. No amount of emphasis upon the economy of gas lighting will instill into the customer's mind a desire for it, unless he is first convinced, that, upon all other grounds, it is at least approximately the equal of any other sort of lighting, nor will the excellence of the company's service be very effective in convincing the consumer that gas is the most desirable illuminant. More attention should be paid to exploiting the positive advantages of gas lighting. Advertise the fact that gas is the only illuminant that actually improves the breathing quality of air in interiors, that

No. 1 or No. 6 Reflex.

Class of Service.	Globe or Reflector. E-1 Holophane No. 0918. Light Walls.	E-1 Holophane No. 0918. Dark Walls.	Alba No. 3415-3416. Light Walls.	Alba No. 3415-3416. Dark Walls.	V. K. Opaline No. 440-441-447. Light Walls.	V. K. Opaline No. 440-441-447. Dark Walls.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Depot (waiting room), factory (general illumination only where local illumination is also provided), hospital (wards without local illumination), hotel (bedrooms), library (stacks), moving picture theatre, residence (reception hall, sitting room, parlor, dining room, laundry, bedroom), shipping room, warehouse.	A 15 0 B 10 0	14 0 9 6	14 0 9 6	13 0 9 0	13 0 9 0	11 0 8 0
Armory or drill hall, auditorium, ball room, swimming pool, court-room, church, garage, hotel lobby, dining room, waiting room, laundry), lunch room, residence (library, music room, kitchen, bath room), restaurant, school (assembly room), theatre (auditorium).	A 16 0 B 9 0	12 0 8 6	12 0 8 6	11 0 8 0	11 0 8 0	9 0 7 0
Carpenter shop, gymnasium, lodge room, school (class room).	A 12 0 B 8 6	11 0 8 0	11 0 8 0	10 0 7 6	10 0 7 6	8 6 7 0
Bank, pattern shop, saloon, school (manual training, laboratory), store (baker, cigar, confectionery, decorator, drug, florist, grocery, lace, music, notion), theatre (lobby).	A 11 0 B 8 0	10 0 7 6	10 0 7 6	9 0 7 0	9 0 7 0	8 0 7 0
Library (reading room, no local illumination), store (book, butcher, men's furnishing, jewelry, leather, shoe, stationery).	A 10 0 B 7 6	9 0 7 0	9 0 7 0	8 6 7 0	8 6 7 0	7 3 7 0
Factory (complete, no local illumination), office, press room, sewing room, stereotyping, store (art, dry goods, hat, millinery, piano, tailor), studio.	A 9 0 B 7 0	8 6 7 6	8 6 7 0	8 0 7 0	8 0 7 0	7 0 7 0
Hardware store.	A 8 6 B 7 0	8 0 7 0	8 0 7 0	7 6 7 0	7 6 7 0	6 3 7 0
Automobile show room, school (drawing), store (clothing, cloak and suit, furniture, furrier).	A 8 0 B 7 0	7 6 7 0	7 6 7 0	7 0 7 0	7 0 7 0	6 0 7 0

A. Figures indicate average dimensions of area covered from each outlet.
B. Figures indicate minimum height of mantles above floor.

2 Light Reflexolier.

Class of Service.	Globe or Reflector. E-1 Holophane and No. 0918 Opaline. Light Walls.	E-1 Holophane and No. 0918 Opaline. Dark Walls.	Alba No. 3415-3416. Light Walls.	Alba No. 3415-3416. Dark Walls.	V. K. Opaline No. 440-441-447. Light Walls.	V. K. Opaline No. 440-441-447. Dark Walls.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Depot (waiting room), factory (general illumination only where local illumination is also provided), hospital (wards without local illumination), hotel (bed rooms), library (stacks), moving picture theatre, residence (reception hall, sitting room, parlor, dining room, laundry, bedroom), shipping room, warehouse.	A 21 0 B 13 0	19 0 12 6	20 0 13 6	16 0 11 6	16 0 11 6	15 0 10 0
Armory or drill hall, auditorium, ball room, swimming pool, court-room, church, garage, hotel (lobby, dining room, waiting room, laundry), lunch room, residence (library, music room, kitchen, bath room), restaurant, school (assembly room), theatre (auditorium).	A 19 0 B 12 0	17 0 11 0	17 0 11 0	14 0 10 6	16 0 10 6	14 0 9 6
Carpenter shop, gymnasium, lodge room, school (class room).	A 17 0 B 11 0	15 0 10 0	15 0 10 0	14 0 9 6	14 0 9 6	12 0 8 6
Bank, pattern shop, saloon, school (manual training, laboratory), store (baker, cigar, confectionery, decorator, drug, florist, grocery, lace, music, notion), theatre (lobby).	A 15 0 B 10 0	14 0 9 6	14 0 9 6	13 0 9 0	13 0 9 0	11 0 8 0
Library (reading room, no local illumination), store (book, butcher, men's furnishing, jewelry, leather, shoe, stationery.	A 14 0 B 9 6	13 0 9 0	13 0 9 0	12 0 8 6	12 0 8 6	10 0 7 6
Factory (complete, no local illumination), office, press room, sewing room, stereotyping, store (art, dry goods, hat, millinery, piano, tailor), studio.	A 13 0 B 9 0	12 0 8 6	12 0 8 6	11 0 8 0	11 0 8 0	9 6 7 3
Hardware store.	A 12 6 B 8 9	11 6 8 3	11 6 8 3	10 6 7 9	10 6 7 9	9 0 7 0
Automobile show room, school (drawing), store (clothing, cloak and suit, furniture, furrier).	A 12 0 B 8 6	11 0 8 0	11 0 8 0	10 0 7 6	10 6 7 6	8 6 7 0

A. Figures indicate average dimensions of area covered from each outlet.
B. Figures indicate minimum height of mantles above floor.

it produces ventilation and circulation of the air, consumes the brain-stupefying organic matter from the lungs, and incinerates bacteria. Show that the only way in which these benefits may be had in con-

(*Continued on page* 390,)

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NEW YORK, MONDAY, JUNE 16, 1913.

BRIEFLY TOLD.

MOTOR FUEL FROM COAL GAS.—Our own Henry L. Doherty has given the English gas fraternity fuel for their thought motors, by his remarks at a dinner given by Lord Montagu, of Beaulieu, in London, the 14th ult. Most of the diners were gentlemen interested in the motor industry, with several prominent gas engineers. Mr. Doherty's remarks were anent the high prices for gasoline, and his proposed remedy was the removal of the available benzol from commercial coal gas; and he estimated that not less than 12 million gallons of this product could be taken annually from the London gas supply alone. His major premise is that the benzol is delivered the gas consumers to whom it does no good; therefore, take it out, and sell it where there is an insistent and increasing demand. Mr. Doherty is not in the habit of giving voice to ideas that he has not thoroughly threshed out in his own mind, and that he is fully prepared to answer all the discussion and objections called forth by his after-dinner remarks is evident by this letter printed in the *Gas World* (London) just prior to his sailing for home. The caption of his communicatinn is "Obtaining Motor Fuel in Gas Manufacture." Dear Sir: Much as as I regret to leave before the meeting of the Institution of Gas Engineers, I am compelled to sail for home this morning. I have read your editorial of the 24th inst. Why say the suggestion for the removal of benzol bristles with difficulties? Why not say the suggestion bristles with possibilities? I do not believe the difficulties are very formidable, and I believe the possibilities are sufficient to bring a new epoch to the gas business. It will be a disappointment to me if many of your British gasmen do not, on careful consideration of this matter, share my views as to the relative difficulties and advantages, and I hope there will be many amongst their number who will show the same progressive and aggressive spirit towards the inauguration of this suggestion that you will find if you go out amongst the automobile men of your country. I cannot concur in your statement that gas must remain the principal product of the gas works, provided we use the word 'principal' in the same sense. In the ordinary coal gas plant we make more coke than gas, either by weight or calorific value. For every million B.T.U. of gas we make three million B.T.U. of coke. We have always aimed to make cheap gas rather than avoid the production of by-products. Another by-product will help us to cheapen our gas, and for every penny this change will produce directly towards increasing our earnings, I believe it is capable of producing 5 pennies indirectly. Neither can I concur in your statement that if improved fuel is to be produced, both solid and liquid, it must be undertaken by the coal owner at the colliery. As a producer of coke and tar, I do not want the coal owner to glut my markets. Every process of destructive distillation produces gas. Gas can only be sold to best advantage by gas companies. Gas companies should be able to sell the other products to at least equal advantage. Whether the coke produced is of the ordinary kind or some different kind, I still believe it can be more economically made in the market where it is consumed than at the colliery."

REPORT OF THE JOINT COMMITTEE ON CALORIMETRY.—A report of the investigations of the conditions governing the choice of a proper quality standard for artificial gas, with conclusions and recommendations, as made to the Public Service Commission, Second District, New York State, by the Joint Committee on Calorimetry, has just been issued by that Committee. Copies thereof can be obtained from the office of the Empire State Gas and Electric Association, No. 29 West 39th street, New York city. The Committee comprises Mr. W. R. Addicks, Chairman, T. R. Beal, M. J. Brayton, H. H. Crowell, J. C. DeLong, A. H. Elliot, J. B. Klumpp, C. F. Learned, W. T. Morris, R. M. Searle, C. H. Stone; C. H. Chapin, Secretary. The Committee has devoted three years to a study of this very important subject, and its findings will have great weight in determining the standard to be adopted, not only in New York State, but in all the other States having commission regulation of utilities. The report comprises some 95 pages, 7½ by 10½ inches, and covers, among other valuable data, the results of nearly 16,000 calorimetric and photometric tests. The Committee's general conclusions advise the adoption of a calorific standard of not exceeding 570 B.T.U., monthly average; and that no candle power standard be considered in connection with the heat unit standard recommended. This is recommended in the belief that such a standard will enable the consumer to obtain the most value for the least money, and will enable the gas companies to obtain the profits at the least expense to the consumers. No award of praise can be too great to pass to the Committee for the weight of its labors, the thoroughness of its research and experimenting, and the clearness and conciseness with which its findings have been presented.

THIRD MEETING, NEW ENGLAND SECTION, "GAS MEETERS."—The third meeting and dinner of the New England Section of "The Gas Meeters," was held the afternoon and evening of the 22d ult. It was first convened in the handsome offices of the Tufts Meter Company, 455 Commercial street, Boston, where the Meeters were entertained, during the process of which wholesouled Henry A. Norton's stock of cigars must have suffered considerable depletion. The factory—and a complete one it is—having been thoroughly inspected, the inspectors adjourned to Rowe's Wharf Station, the Boston Yacht Club, where dinner was served and enjoyed, at 6 P.M. After dinner the regular order of routine business was taken up. The Report of the Nominating Committee, recommending the gentlemen to serve as officers for the ensuing year, was considered and accepted. This means that the office bearers for 1913–14 are:

Chairman.—Frank W. Jennings.
Secretary.—F. K. Wells.
Commissioners.—Cyrus Barnes and T. H. Piser.

It was also decided that the Board of Commissioners be increased to 5 members; and, on motion, the Secretary was instructed to communicate with the New York Section of the Grand Body, to determine whether the naming of 5 Board members instead of 2 would conflict in any wise with the Constitution of the Grand Body. Mr. H. A. Norton, of the Tufts Meter Company, then spoke informally and well, on the gas meter industry in particular and the gas business in general. His interesting dissertation was followed by a "rising and rousing" vote of thanks to the Meter Company and himself, for their joint courtesies and genuine hospitality. During the evening the entertainment was heightened by some good singing, prominent in this feature being the quartette of the Brockton (Mass.) Gas Light Company, the members of the quartette being Messrs. J. Neafsey (first tenor), J. P. Moran (second tenor), H. Owens (first basso), D. J. Buckley (second basso). The songs were in excellent taste and beautifully rendered. A rising vote of thanks was passed to the Brockton Gas Company, to the quartette and to the retiring Board of Officers, after which the meeting was declared adjourned.—W.

JOINT OUTING, PHILADELPHIA SECTION, AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS AND THE PHILADELPHIA SECTION, ILLUMINATING ENGINEERING SOCIETY.—The joint outing of the named Societies was held in Philadelphia, the afternoon of Saturday, the 7th inst.,

on the splendid grounds and in the spacious quarters of the Philadelphia Electric Company's Athletic Association. The affair of the afternoon was a baseball game between nines representing the two bodies, and it was remarkable from the fact that the contest was declared a tie. On the conclusion of the game the members and guests (totalling at least 100) assembled around the Club House porch, and there listened to a most entertaining talk (it was really a lecture) on "Baseball Curves," by Professor Franklin, of Lehigh University, in the course of which the learned gentleman completely demonstrated a complete knowledge of the "mysteries" that accompany concomitantly the work of a modern exemplar of the "Boxman's" art. Following the Professor's exemplification was an enjoyable and enjoyed dinner, which was nicely served, the tables being set and served on the beautiful lawn. Excellent music, by the orchestra of the Philadelphia Electric Company, enlivened the occasion, which beyond doubt was a thoroughly pleasing fraternal affair.—E.

JUNE MEETING, PHILADELPHIA SECTION, "GAS MEETERS."—Mr. John D. Grady, Acting Secretary, informs us that the June meeting of this body will be held, the evening of Thursday next, in Kugler's restaurant, 1412 Chestnut street. Preceding the business session dinner will be served in Kugler's, at 6 P.M. Secretary Grady urges the importance of this meeting, which will be the last until the fall season, and at which officers for the ensuing year will be chosen. Wherefore he hopes for a banner attendance.

NEW YORK SECTION, "GAS MEETERS."—The 19th session of the New York Section, "Gas Meeters," was held in the Dun Building Restaurant, at Broadway and Reade street, at 6 P.M. on Thursday, the 12th inst. This was the annual meeting and was attended by 47 "Meeters," who listened with gratification to Chairman Barnes' reading of the report of the outgoing Board of Commissioners, which follows:

NEW YORK, June 12th, 1913.

To the New York Section of the "Gas Meeters:" Your Commissioners are pleased to report a very successful year for the Association. The meeting this evening is the 19th meeting since its organization, each meeting having been of great interest and being well attended, the total attendance counting 580. We will not go into detail as to the entertainment offered at our various meetings, but suffice it to say we have had as speakers men of prominence in the gas fraternity, whose subjects were both interesting and instructive. At the time your Commissioners were elected to serve you your Association was somewhat in debt. By careful management we have carried these meetings through, and your Secretary and Treaurer reports we have cash on hand to the amount of $35.37. Only those who have had to do the providing for your various meetings, can appreciate what it means to carry a year's work through successfully, with the balance on the right side of the cash book. During the past year three new Sections have been formed, Cleveland, New England and Winona, Minn., and all the sections, including Philadelphia and New York, are working under the Constitution adopted some months ago. Your Commissioners feel that this Constitution is not such as to meet all requirements, and we respectfully suggest a revision of the same. We would also suggest having every third meeting devoted to business of the Association, instead of carrying such matters through the year and acting on them only at the annual meeting. We would also suggest incorporating in the Constitution and By-laws, that no member of the "Gas Meeters" is eligible to vote or hold office unless duly registered by payment of the registration fee of $1. We congratulate the "Meeters" on the character of their attendance, and we wish for our successors a year full of promise, goodfellowship, and continued interest.

Respectfully submitted, WILL. W. BARNES, Chairman.
I. W. PEFFLEY,
W. H. PETTES.

Secretary-Treasurer J. M. Brock made his report and Mr. O. F. Potter reported as Auditor of the Treasurer's books. The election resulted in the selection of Mr. W. H. Pettes as Chairman and Mr. T. M. Ambler and Mr. J. M. Brock, Associate Commissioners. Mr. G. E. Smith was chosen Secretary-Treasurer, and at once got busy issuing the new "Meeters'" buttons and the registration cards. The dinner itself was the best that the "Meeters" have had.

CURRENT MENTION—

THE Pittsburg Water Heater Company informs us that Mr. F. J. Jara has been appointed its Sales' Manager for the New Orleans division of its trading, with headquarters at No. 836 Baronne strees.

THE Common Council, of Lancaster, Pa., through the recommendation of its Lamp Committee, has accepted these bids for the lighting of the public lamps of that city for the ensuing year: Lancaster Gas Light and Fuel Company, $30 per lamp for each Welsbach used, and $12 for maintenance; and $39 for Welsbach lamps of the gasoline type—there are only 25 of these in service. The rate on latter account for the past twelvemonth was $32 per lamp, and the increase this year represents the higher charge for gasoline, per gallon.

"EARLY this month (the evening of the 3d, in fact) the Key West (Fla.) Gas Company's Employees' Association held a meeting in the Company's offices, junction of Fleming and Simonton streets. The practical section of the meeting included a paper, by Mr. C. W. Cleare, the subject of which was 'Work Cards.' Mr. Cleare evidently had put much time and thought in the paper, and he was rewarded by a brisk discussion. A second contribution was from the pen of Mr. W. B. Simcox, who went quite thoroughly into the timely matter of 'The Maintenance of Gas Arcs.' That his subject was under current consideration by his hearers was evident from the way in which they plied him with questions. However, Mr. Simcox was 'very much on the job,' since he had an answer offhand for every query propounded. The 'only' Lee Stanley, capable custodian of the Company's stores that he is, wound up the technical side of the assembly by a running recital of the trials and tribulations of the storekeeper in general. The business session at an end, the members adjourned to the messroom of Mr. George Spielmon and Mr. John Wilson, where refreshments were served. On breaking-up, rather at leave-taking, Stanley seemed to voice the general sentiment that their hosts would certainly make excellent hotelkeepers.—V. T."

THE South Shore Gas Company, Babylon, L. I., has applied to the New York Public Service Commission, for the Second District, for the approval of a franchise recently granted by the authorities of Islip, under which the Company may construct and maintain a gas plant within the township limits for the purpose of manufacturing and distributing gas, for light, heat and power use to the inhabitants. The Company also makes further application for the approval of a proposed lease of the franchise mentioned to the Suffolk Gas and Electric Light Company, of Bay Shore, Suffolk county, N. Y.

IT is interesting to note that the MacArthur Concrete Pile and Foundation Company, 11 Pine street, N. Y., has been authorized to place the foundation for the 12 story, arcade structure, to be erected at New and Beaver streets, Manhattan. This foundation will comprise about 150 steel-concrete piles, the method of placing which is as follows: A 12-inch steel pile is driven to rock, the soil in the pipe being blown out by the aid of compressed air, whereupon the cavity is filled with concrete, reinforced by 2-inch steel rods. The Consulting Engineer for the work is Mr. Robert E. Moss.

THE Gas Machinery Company, Cleveland, O., is erecting coal gas benches, equipped with silica retorts and settings, in the gas plants at Bellingham Bay, Wash., and Salem, Ore.

PRESIDENT CULPEPPER EXUM, of the Birmingham (Ala.) City Commission, is proposing an "exam." with the proprietors of the Birmingham Railway and Light Company as to a revision of the gas rates charged by that corporation, the joint discussion being traceable to the report submitted by Capt. Romaine Boyd, the City Attorney, The latter claims that the gas rate in Birmingham should be lower in accordance with an old contract between the city and the Company, in which it is specified that the Birmingham rate may not exceed the rates charged in other cities corresponding in area and population. Culpepper Exum! Well, that sounds like one possessing a hot nature.

MR. WILLIAM C. ROBINSON, of 27 Upsal street, Germantown, Pa., heads the eligible list for appointment to the position of Chief of the Bureau of Gas, Philadelphia, which post is now provisionally held by Dr. J. Hollis Godfrey, of New Bedford, Mass. Dr. J. Hollis must be the possessor of an eagle eye and a massive brain, for since he succeeded Dr. E. Wiley Thomas, the former occupant of the place, which succession is certainly not over a twelvemonth, he has managed to pile up complaints against the Welsbach Street Lighting Company that, if proved under the statutes, would cause the latter to be fined about $48,000, or so. In truth, 98 per cent. of these fines could never be collected since about that percentage of them are traceable to acts over which the Welsbach Company has no possible control—the boys with their beanshooters, the snows of winter, the blows of spring, the drenchings of summer and the vagaries of fall.

(*Continued from page* 387.)

3-Light Reflexolier.

Class of Service.	Globe or Reflector.					
	E-1 Holophane and No. 0918 Opaline.		Alba No. 3415-3416.		V. K. Opaline No. 440-441-447.	
	Light Walls.	Dark Walls.	Light Walls.	Dark Walls.	Light Walls.	Dark Walls.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Depot (waiting room), factory (general illumination only where local illumination is also provided), hospital (wards without local illumination), hotel (bedrooms), library (stacks), moving picture theatre, residence (reception hall, sitting room, parlor, dining room, laundry, bedroom), shipping room, warehouse.	A 26 6 B 15 9	24 6 14 9	25 0 15 0	22 0 13 6	23 0 14 0	19 0 12 6
Armory or drill hall, auditorium, ball room, swimming pool, court-room, church, garage, hotel (lobby, dining room, waiting room, laundry), lunch room, residence (library, music room, kitchen, bath room), restaurant, school (assembly room), theatre (auditorium).	A 22 6 B 13 9	20 6 12 9	21 0 13 0	19 0 12 0	19 6 12 3	17 0 11 0
Carpenter shop, gymnasium, lodge room, school (class room).	A 20 6 B 12 9	18 6 11 9	19 0 12 0	17 0 11 0	17 3 10 9	15 0 10 0
Bank, pattern shop, saloon, school (manual training, laboratory), store (baker, cigar, confectionery, decorator, drug, florist, grocery, lace, music, notion), theatre (lobby).	A 18 6 B 11 9	16 6 10 9	17 0 11 0	16 0 10 6	16 0 10 6	14 0 9 6
Library (reading room, no local illumination), store (book, butcher, men's furnishing, jewelry, leather, shoe, stationery).	A 17 6 B 12 3	15 6 10 3	16 0 10 6	15 0 10 0	15 0 10 0	13 0 9 0
Factory (complete, no local illumination), office, press room, sewing room, stereotyping, store (art, dry goods, hat, millinery, piano, tailor), studio.	A 16 6 B 10 9	14 6 9 9	15 0 10 0	14 0 9 6	14 0 9 6	12 0 8 6
Hardware store.	A 15 6 B 10 3	13 6 9 3	14 0 9 6	13 0 9 0	13 6 9 3	11 6 8 3
Automobile show room, school (drawing), store (clothing, cloak and suit, furniture, furrier).	A 14 6 B 9 9	12 6 8 9	13 0 9 0	12 0 8 6	12 6 8 9	11 0 8 0

A. Figures indicate average dimensions of area covered from each outlet.
B. Figures indicate minimum height of mantles above floor.

4-Light Reflexolier.

Class of Service.	Globe or Reflector.					
	E-1 Holophane and No. 0918 Opaline.		Alba No. 3415-3416.		V. K. Opaline No. 440-441-447.	
	Light Walls.	Dark Walls.	Light Walls.	Dark Walls.	Light Walls.	Dark Walls.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Depot (waiting room), factory (general illumination only where local illumination is also provided), hospital (wards without local illumination), hotel (bedrooms), library (stacks), moving picture theatre, residence (reception hall, sitting room, parlor, dining room, laundry, bedroom), shipping room, warehouse.	A 30 0 B 17 6	28 0 16 6	28 0 16 6	26 0 15 6	26 0 15 6	22 0 13 6
Armory or drill hall, auditorium, ball room, swimming pool, court-room, church, garage, hotel (lobby, dining room, waiting room, laundry), lunch room, residence (library, music room, kitchen, bath room), restaurant, school (assembly room) theatre (auditorium).	A 26 6 B 15 9	24 0 14 6	25 0 15 0	22 0 13 6	22 0 13 6	19 0 12 0
Carpenter shop, gymnasium, lodge room, school (class room).	A 24 0 B 14 6	21 0 13 0	22 0 13 6	20 0 12 6	20 0 12 6	17 0 11 0
Bank, pattern shop, saloon, school (manual training, laboratory), store (baker, cigar, confectionery, decorator, drug, florist, grocery, lace, music, notion), theatre (lobby).	A 21 0 B 13 0	19 0 12 6	20 0 12 6	18 0 11 6	18 0 11 6	16 0 10 6
Library (reading room, no local illumination), store (book, butcher, men's furnishing, jewelry, leather, shoe, stationery).	A 20 0 B 12 6	18 0 11 6	18 0 11 6	17 0 11 0	17 0 11 0	15 0 10 0
Factory (complete, no local illumination), office, press room, sewing room, stereotyping, store (art, dry goods, hat, millinery, piano, tailor), studio.	A 19 0 B 12 0	17 0 11 0	17 0 11 0	16 0 10 6	16 0 10 6	14 0 9 6
Hardware store.	A 17 0 B 11 0	16 0 10 6	16 0 10 6	15 0 10 0	15 0 10 0	13 0 9 0
Automobile show room, school (drawing), store (clothing, cloak and suit, furniture, furrier).	A 16 0 B 10 6	15 0 10 0	15 0 10 0	14 0 9 6	14 0 9 6	13 0 8 6

A. Figures indicate average of area covered from each outlet.
B. Figures indicate minimum height of mantles above floor.

Class of Service.	Inside Arc Lamp.				Outside Arc Lamp.			
	4-Mantle.		3-Mantle.		5-Mantle.		3-Mantle.	
	V. K. Opaline Globes.		V. K. Opaline Globes.		V. K. Opaline Globes.		V. K. Opaline Globes.	
	Light Walls.	Dark Walls.	Light Walls.	Dark Walls.	Light Walls.	Dark Walls.	Light Walls.	Dark Walls.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Depot (waiting room), factory (general illumination where additional local lighting is provided), warehouse, shipping room.	A 28 0 B 16 6	25 0 15 0	25 0 15 0	21 0 13 0	31 0 16 0	28 0 12 6	26 0 15 6	22 0 13 6
Armory, auditorium, garage, lunch room.	A 25 0 B 15 0	21 0 13 0	21 0 13 0	18 0 11 6	29 0 17 0	25 0 15 0	22 0 13 6	19 0 12 0
Gymnasium, lodge room, power house, china store.	A 22 0 B 13 6	19 0 12 0	19 0 13 0	16 0 12 6	26 0 15 6	22 0 13 6	20 0 12 6	17 0 11 0
Foundry, market, bakery, cigar, drug, grocery and notion store.	A 20 0 B 12 6	17 0 11 0	17 0 11 0	15 0 10 0	24 0 14 6	21 0 13 0	18 0 11 6	16 0 10 6
Book, men's furnishing, shoe and stationery store, meat market.	A 18 0 B 11 6	16 0 10 6	16 0 10 6	14 0 9 6	22 0 13 6	19 6 12 0	17 9 11 0	15 0 10 0
Dry goods, millinery, hat, piano and tailor store, factory (complete—no local illumination).	A 17 0 B 11 0	15 0 10 0	15 0 10 0	13 0 9 0	20 0 12 6	18 0 11 6	16 0 10 6	14 0 9 6
Hardware store.	A 16 0 B 10 6	14 0 9 6	14 0 9 6	12 0 8 6	19 0 12 0	17 0 11 0	15 0 10 0	13 0 9 0
Clothing, cloak and suit, furniture and fur store, automobile show room.	A 15 0 B 10 0	13 0 9 0	13 0 9 0	11 0 8 0	18 0 11 6	16 0 10 5	14 0 9 6	12 0 8 6

A. Figures indicate average dimensions of area covered from each other.
B. Figures indicate minimum height of mantles above floor.

nection with other illuminants is by the addition of ventilating fans and ozonizers. Play up every advantage, trivial or otherwise, as if the fate of the business depended upon it. No talking point is so unimportant that it may not, under some circumstances, turn the balance effecting a sale. A case in point is the color value of gaslight. In a very large proportion of stores true color value, in artificial light, is of great importance and has a value that will be appreciated by the merchant if properly presented. In this respect the incandescent gas lamp is far superior to the tungsten electric lamp. Do we all make the most of this feature? A customer who uses gas because of its economy is always a doubtful asset. He is apt to be lost by the different developments in competitive illuminants, that wipe out the cost differential in your favor. On the other hand, the customer who uses gaslight because he believes it the best and most desirable illumination at any price, is an asset as dependable as the recurrence of day and night. The cultivation of this sentiment in the public should be the first concern of every gas company. It cannot be done by advertising alone. It must be radiated by every individual in the employ of the company who comes in contact with the public. Before the salesman can inject his customers with the spirit, he must have it himself. What we need is to innoculate ourselves with the idea that anything that may be done with gas, is done *best* when done by gas.

Discussion.

The author was granted a rousing round of applause on retiring from the readers' stand. The President called upon Mr. Burr to open the discussion.

Mr. Burr—It is gratifying to a gas salesman to note the commercial attitude and spirit so apparent in our engineer friend, Mr. Pierce. In presenting his able paper he becomes a salesman of the highest order, by giving us something tangible. "Gas lighting the very best ad." Unquestionably this is so; and the prefix "Good" is understood. Again: "No one outside of the families who use gas ranges ever hear of them." Those of us who are striving to sell gas, and "still more gas," must not, by any manner of means, accept this statement too literally. Of course, we desire the kitchen gas lighted; moreover, it should be an all-gas-kitchen, for if so, it becomes not only a first-class "ad," but a valuable asset to the public and the company alike. It creates a favorable impression and makes gas more popular. The retention of gas lighting business and the securing of future business are largely dependent on our ability to install the proper lighting unit as it should be, and maintain it at its highest efficiency at all times. Mr. Pierce has pointed out why it is necessary that the gas lighting load must be maintained, and as well the situation, with reference to furnishing off-peak electric current at low prices, that provides sinews of war for further conquests, and may mean loss of gas business. The company selling gas at $1, for use in gas engines,

will not, under the above conditions, be able to install many new gas engines. Yet gas engines of 5 to 50-horse power yield most desirable day load business. Another form of electric competition, not referred to by Mr. Pierce, is the insistence on the part of some companies that, when a small volume of electric current is required, say ½-horse power or less, that the prospect is required to install a certain number of electric lights in order to bring the total consumption of current up to what may be deemed a minimum bill. If the prospect is using gas for lighting, likes it and wants to keep it, but must have power to operate fans or for other small operations, he is simply obliged to give up the gas and install electric lights. The piping of buildings throughout is of great importance. Indeed, it is one of the company's greatest problems, and in the majority of cases is settled by the architect for his client. The client, being advised by him that gas is not needed except in the kitchen and in the laundry, accepts this as final, especially when reminded that it will cut a slice off the cost of erection. Mr. Pierce makes no direct reference to grades of burners or lamps supplied by manufacturers. While these are improved in many instances they are defective or of poor quality, hence a menace to the business. The best being none too good, it behooves gas men to see that a higher general standard is attained. In pointing out what may be expected from properly installed gas light, as to its performance, life, cost, etc., Mr. Pierce omits the human factor. In a recent light selling campaign, in New Haven, it was afterwards found that many complaints of poor light were directly traceable to the curiosity and meddlesomeness of different members of the family, a condition that may not exist with reference to electric lighting; but that is another reason why a gas company should control or maintain lights. It seems to me it is well taken, and should be borne in mind as an argument to secure more business, that the small pilot light locates the lamp in a dark room. Moreover, let us not forget that the gas consumed through pilots will nearly liquidate the maintenance cost. As regards vitiation of the air and the heat from gas lighting, facts favorable to the use of gas lamps are proven, but gas companies have been slow in putting them before the public or even to the salesman. These should be put in condensed, comprehensive form, so that "He who runs may read." Only recently has the gas man had good, small gas lighting units, whereas the electric man has always had them. Therefore, the gas man is now in a position to better avoid over-illumination and cut down radiant heat, thanks to our manufacturing friends. The point is well taken that small units, properly installed on home fixtures, are preferable to one large unit on a 2, 3, 4 or 5-arm fixture. Semi-indirect light is splendid, and is also one where gas excels. With the burner concealed, however, it is most important that the gas company should maintain the light, otherwise the consumer, through his neglect, will suffer loss of light, and without troubling to investigate would be easily persuaded to use electric light. I do not agree with Mr. Pierce when he states that every gas fixture should be equipped with mantle burners. It is not practical in all cases, although it may be in the majority. Nor do I agree that the company should give away small mantle burners. As good, if not better, results can be attained, at least in the majority of cases, if a vigorous effort is made to replace open flame burners; and, on new fixtures, to first install new mantle burners on some sort of a sale basis. This would remove any suspicion of an ulterior motive on the part of the company and raise the standard of gas lighting. We should make haste to get away from cheap gas lighting, something that the public has had handed to them for years past. Talk much and earnestly about a quality of the light that aids ventilation, improves the air, renders colors correctly and prevents eye-strain. We are fortunate in having this information in the form of tables as a guide to proper lighting. A representative who works along this line will doubtless get business for his company, which will not be easy for the electric men to take away, as was the case in the early days of gas arc lighting, when the public demanded a large volume of light. The incentive for so-called real advertising, in his paper, is of much value, but of course must be tempered in accordance with local conditions. Surely we should innoculate ourselves with the idea that "Everything that can be done with gas is best done with gas;" a most excellent motto which every gas man should take to heart, preach and practice.

Mr. Witte—I agree with Mr. Pierce on the importance of piping, and I would like to lay stress on the matter of fixtures. The majority of gas men are inclined to leave the fixtures to the architect or contractor, and invariably we see that the fixtures are arranged for gas illumination upward, and very often such a mantle lamp will make a very awkward looking fixture. I think it is almost as important to get the right fixtures in residences or stores as to have correct piping. When this matter is not followed up properly, as I have had opportunity to observe several times, electric fixtures have been installed, because the electric man had "pretty showers" or attractive fixtures. Proper illumination is very important. Gas arcs are in many cases a necessity, but very often single units are superior, and compete better with the electric illumination in price as well as the quality of the light. With the shades we have to-day, we can diffuse our lights, throw our illumination exactly where it is wanted, and to as good advantage as the electrician. We had a case last week, where a store having old, upright, arcs and a few inverted ones, used mostly electric lights. The illumination by gas was satisfactory, but the 5 light electroliers were so much more attractive that they used electricity. We put in two 4-light reflexoliers on trial and, immediately following this, we put in 16 more. He said it was the best illumination he had seen. To-day he uses nearly all gas, with electricity only as an auxiliary. In factories we find, to a great extent, under illumination. I have found in factories electric lamps placed over machines, giving sufficient light for the darkness in the evening but not in the semi-darkness of dark days. We installed reflex lights or arcs, whichever was necessary, to penetrate the semi-darkness and found that the men turned out as much work as they could by bright daylight. This they considered a great advantage. In one factory we substituted mantle light for electric light and open burners, and reduced their expense from $360 to $200; within 6 or 7 months they increased their consumption to over $300, and were absolutely satisfied. I spoke to the owner about it, and although his expenses for illumination were now almost what they had been with electricity and open burners he said, "See, what a volume of light I am getting." He was a very thorough business man, who had figured out carefully the output on dark days, with the advantage of being able to see defects in his manufactured articles which he could not detect under the other system. Among the shoe manufacturers in Haverhill very little gas is used for fuel. Here gas lighting is very important since so little is used for fuel that it would hardly justify piping. In some factories where they are using electricity for illumination they use electrical appliances for fuel at an increased cost. To make a comparison of the gas consumed by one factory: Its average bill for illumination was $50 to $53, and that for the fuel appliances amounted to $12 to $14. In one instance nearly half a factory changed from open burners to electric illumination. We put in a trial installation and succeeded in having electricity taken out and equipped the factory with all gas, also a gas steam boiler. As Mr. Pierce says, they do not see the gas stove and fuel appliances; but they do see the lights. Take our electrical competitor, who has fine industrial appliances; his window is decorated with fancy fixtures and splendid illumination and it attracts everybody. If the gas companies are as attractively equipped when they have the ear of the manufacturer, or the lady of the house, or the architect, they can talk other appliances to them a great deal more resultfully.

Mr. Ware—It was brought home to me forcibly a couple of years ago, when we were putting on the Boston gas show, that as a body we were weak in not going after the expensive fixtures. The whole tendency has been for a long time (it is getting better now, but there is still room for improvement) to go after the cheap fixture, or to put in something that, being inexpensive, will sell readily. When we canvassed the fixture manufacturers for exhibits we found them difficult to corral. Many of them would not pay any attention to the suggestion; some said they might consider it, but their feet got cold very soon. We finally got 2 or 3, and one of them told me he had just completed a tour of practically the whole country. He said the gas companies would give an order for little fittings, 75 cents here and $1.50 there, little droplights and little, slim, fixtures. He said his whole trip had only netted him about $2,000 worth of business. But the electric companies did not care about the cheap stuff. They could get that in their home towns. They went in for the expensive fixtures, because they made a show that would lend dignity to their product. He said, "If this is the sort of backing we are going to get from the gas people, why should we exhibit? What incentive is there for us to spend money in developing lighting fixtures, if nobody is going to use them?" It seems to me that in our own offices we are weak, and I make the suggestion that the gas companies fit out their own offices with absolutely the best fixtures, as well as the best systems, that they can obtain and devise. Don't simply be content with putting in an up-to date burner, but put in the best fixture that you can possibly get. Probably the worst difficulty the gas man has to contend with at the present time is the peddler and his

cheap mantles. Is it possible to cut off these cheap mantles at their sources? The mantles, as I understand it, that the big manufacturers make that do not pass inspection, are sold to the peddlers. These go out under the peddlers' own labels and are sold at anywhere from 5 to 30 cents, according to how voraciously the customer will bite. Wouldn't it be better for the gas industry to pay a trifle more for good mantles, having all the cheaper grade ones burned for the ash, and turned back into the raw product? Would not the gas industry benefit more in the long run by paying a trifle more for mantles and having none but good mantles on the market?

The President—I think the point taken by Mr. Ware is a very important one. Mr. Pierce, will you kindly answer the question?

Mr. Pierce—Mr. Burr called attention to several statements which were made so broadly that naturally they would have to be taken with some allowance for local conditions, hence not taken literally. A good many statements were made that I would not wish to have taken literally, for every one under every circumstance. They are suggestive of a general line of thought more than anything else. I did not mean to convey the opinion that a gas range had no advertising value. Every appliance that burns gas, if satisfactorily installed and if it gives satisfactory service, has great advertising value. What I meant to convey was that the advertising value was very largely circumscribed by reason of the appliance itself and its location, whereas the advertising value of a gas lamp is a different proposition. As to a street lighted by gas, everybody in the town knows that that street is so lighted. They cannot get away from it; they cannot fail to see it. As Mr. Burr says, the unsatisfactory performance of lamps is often due to the fact that people will meddle with the adjustments. The fact that adjustment is necessary is, of course, due to the nature of gas supply. If gas were supplied at an absolutely uniform pressure and of an absolutely uniform quality, we could make a burner that would not need any adjusting device, and it would give better service than any adjustable burner could possibly give. That is one of the things we have to fight against, and the best we can do is to educate the consumer to depend upon the gas company for such attention as may be necessary. In Toronto, Mr. Hewitt has a very excellent plan in operation. Starting about a year ago with two men in his residence maintenance department, he now has about 40; and he is proposing to put on others. Those men call on every resident in Toronto at least 3 times a year (he is going to try to make it 4) and make any minor repairs without charge. Each man carries about $7 to $8 worth of material, burners, mantles, etc., which latter are installed at the customers' wish, free of charge; that is, they are charged for material only, the labor of inspection and installing the appliance being free. Mr. Hewitt states this plan has been so successful that he is going to expand it. He is up against a very severe competitive situation there, inasmuch as the price of electricity runs down to a much lower figure than is usually charged for residence service. I believe the more you can make the customer depend on you the better you will be off. That will also eliminate the trouble of cheap mantles to a great extent. If you install such a residence maintenance system as they have in Toronto, every consumer would naturally prefer to buy his supplies from the gas company, knowing that a man will call at regular intervals, and that the company will be responsible for the proper behavior of the appliances. The cheap mantles on the market are mantles that are cheaply made. Less expensive material goes into them; they are less heavily saturated; they are hardened in lots of 10 and 12, whereas the better ones are hardened one at a time. As for the "seconds" of the best mantles, it is more profitable to burn them for the ash than to sell them as "seconds;" but there are undoubtedly a great many "seconds" on the market. I don't know where they all come from, but a great many of them are imported. It is a very serious thing, and I wish we could get away from it; but I do not know exactly how we can. Whenever there is a demand for an article, that article will be manufactured. We do not have the centralized control over the mantle manufacturing industry that we have in the electrical industry, where all the different sorts of electric lamps are put out by one concern and of only one grade, and that grade is the only one that can be purchased. Through a process of evolution the manufacturers have been well supported by the electrical central stations. I think ultimately a similar standardization of quality could be obtained in the gas industry through proper support. The first thing to receive consideration would be for the gas company to make every effort possible to place high grade mantles and like burners on every fixture. Some find it good policy to give away burners; in other places the fixtures are loaned on a contract. I think in York, Pa, they are out on yearly contract, and if a customer wants combination fixtures they loan the fixtures to him on the same basis, charging him only for maintenance. I do not know that the same plan could be worked out satisfactorily for residence burners in all cases; but I know it has in some. Both Mr. Ware and Mr. Witte spoke of the necessity of pushing high grade fixtures. I don't believe we realize what can be accomplished in the way of selling high grade fixtures until we try. In the display rooms of the Philadelphia Gas Works they have gas fixtures running up to $190 each, and are selling them too; in fact, the trade therein is surely expanding every day. They have glassware for individual burners, running to $9 apiece, and the sales of these are on the increase. The average price of fixtures sold in the display room is $30, and the average price per piece of glassware is $1.50. It is safe to say, if they carried no fixtures above $30, and no glassware above $1.50, their averages would be not over $15, and 50 cents, respectively. One of the most interesting aspects of this matter is the type of fixture that goes into operation houses. A builder will let a contract for 200 houses, and the manufacturer who makes the cheapest fixtures will get in his product, and nearly always it is a fixture with open-flame tip. The person who rents the house does not wish to spend $40 or $50 for fixtures, not knowing how long he may remain in it, nor whether he can utilize the burners in some other house. I believe it would be good policy on our part to arrange with the fixture dealers whereby an inexpensive upright lamp or burner would be placed on every one of those fixtures. I don't think it would be necessary to do it gratis. I think we could arrange to make the expense very small; then every one of those houses would be equipped with modern fixtures and require nothing but the mantle to set the meter going. As it is now, the tenant has to buy burners, mantles, glassware and everything. Mr. Witte spoke of factory lighting, which, I think, is an especially good field for gas lighting. The matters with which we have to contend, the prejudice against gas lighting, etc., does not exist to anywhere near so great an extent in factory lighting, and the business is obtained more on a competitive basis (the cost of producing illumination) and in that we have considerable advantage. Furthermore, we have the additional advantage, that a large proportion of factories buy electric currend on a demand basis; first, a demand charge, then the meter charge afterwards. If you can show the manufacturer that, by doing his lighting by gas, he will decrease the demand charge, and thus cut down his electric current cost for all other service, we have a very powerful argument towards the use of gas for lighting. I know a manufacturer who figured that his lighting demand accounted for an increase in his average electrical costs of about ¾ of a cent per kilowatt hour, and by turning his lighting equipment over to gas he obtained his electric current for about two cents. Of course, his demand charge was very high. That is rather an extreme case; but, at any rate, it is an economy that can be taken advantage of and turned into capital. Mr. Burr also mentioned the fact that electric current is sold in a great many pieces on the basis of a minimum charge, and that when the charge was not approached by the service for which electricity was required, it might be necessary to resort to electric lighting as well. Of course, in that case, a man can figure that, paying for his electricity, whether he uses it or not, he might as well use it. There is no particular argument that we can offer in that case. To a man who is getting electricity for nothing, we have not many arguments to offer. The thing to consider in that case is whether a similar system of charging for gas is not advisable. The disadvantage under which we suffer, is the gas business is so old that it has been pretty thoroughly regulated. We are circumscribed in what we may do, in the way of charging for gas for different classes of service, by legislative enactment. The electrical industry is newer and has not been so thoroughly regulated yet; but may be in the course of a few years.

On motion of Mr. Morrison (seconded by Mr. Wade) a vote of thanks was tendered to Mr. Pierce for his instructive and generally valuable paper.

The President—We will now listen to the

Report of Committee on President's Address.

Chairman Gould—The Committee find the President's address so excellent in all its details that it would be an injustice, to the document as a whole, to specially comment on only a few of its items. We would recommend its careful perusal in printed form by all of the members of this Association.

The Vice-President—To save time, I will order the report accepted and the thanks of the Association given to our President for the very able manner in which he has conducted our "Proceedings."

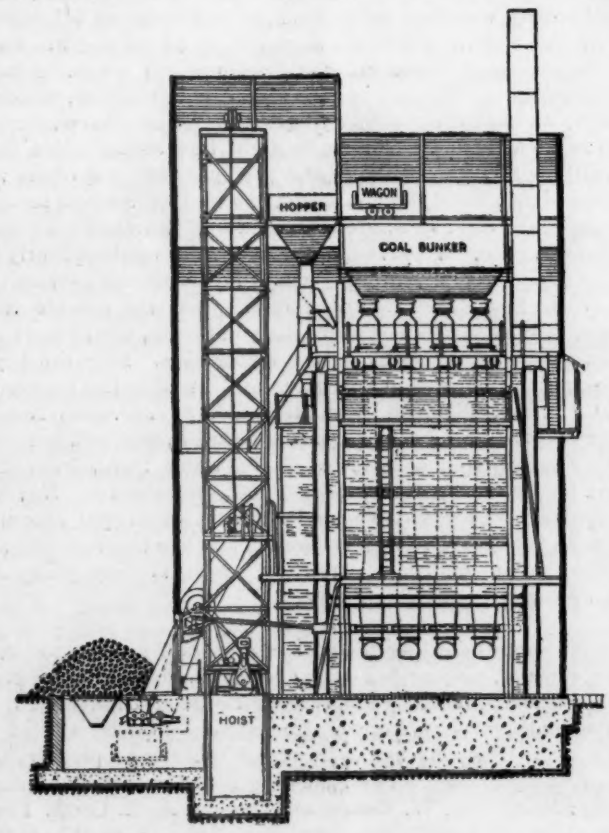
A motion to adjourn prevailed.

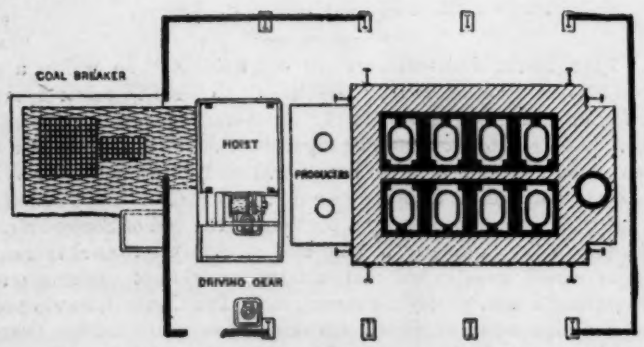
New Methods and Appliances.

VERTICAL RETORTS IN A SMALL GAS WORKS.—In August, 1911, the Lurgan (England) Gas Light and Chemical Company put in operation an installation of 8 Glover-West verticals, replacing their old horizontals. A comparison of 1 year's results from the two systems is shown in the following table:

	Horizontals. 12 Months.	Verticals. 12 Months.
Coal carbonized, tons	4,316	3,958
Gas made, cubic feet	44,513,500	47,031,600
Gas made per ton of coal carbonized, cwt.	10,313	11,882
Coke for sale per ton of coal carbonized, cwt.	7.78	9.00
Carbonizing wages	$2,156	$1,171
Do., per ton of coal carbonized	50 cents.	29 cents.
Illuminating power	18 candles.	16 candles.

The new plant was designed particularly for a small works, and the general arrangement is shown in the plan and elevation herewith.





Its operation has been entirely satisfactory under all the fluctuations of demand. The retorts are heated by two producers, located at the end of the setting; each producer serving 4 retorts, and these are so arranged that any individual retort can be cut out by dampers. The coal is broken and elevated to the overhead hopper, having a capacity sufficient for 24 hours, and the charging and discharging apparatus is an adaptation of the customary Glover-West system. This is believed to be the first installation of verticals on so small a scale, and the results seem to open up a new field for their development.

THE W. M. CRANE COMPANY'S CONFECTIONER'S STOVE.—The majority of manufacturing confectioners—especially those who prepare candies that might be termed of the conventional sort—are remarkably slow in getting into their heads that gas can and is being used most successfully as the fuel for heating large batches of candy material. The backwardness of the average confection maker—the "average" is usually a German of not the most profound intelligence; rather, make it over-conservative—in adopting new heating methods is in the fact that he is confident it is necessary to use a blast to successfully make "hard candy." However, it isn't necessary, for the Crane No. 695 device has been tried out for months in the fully equipped Crane factories; and examples of said Number are now proving, in almost every State of the Union, that candy of the hardest sort can and is being made everyday without a blast. Here is a figure or so from a trial test made in the Crane shops the other day:

A 50-pound batch was raised to 330°, in 31 minutes, with a gas consumption of 7.5 cubic feet. That is a fair-sized batch; and, consider the time required and the cost of the fuel used, not to pay any regard to the facility and cleanliness of the operation?

AN IMPROVED BURNER FOR THE GAS COOK STOVE.—There has been no material change in the design of gas burners for the range and cooker used in the home, since the advent of this type of stove. The stove trade now is much interested in a burner of a radically new design, which has just been brought out. This burner, which is covered by patents, is called the Sherman Equal Heat Gas Burner, the name being suggested by the perfectly even and equal distribution of heat which it makes possible.

The burner, as shown in the illustration, is made up of like sized intersecting circles of flame jets, distributing the heat in equal proportion over the entire area of the burner. It is also claimed for this design that the greatest possible amount of air is brought to each jet, because of the uniform spacing between and around the jets. The circular shape furnishes an unobstructed passage for the flow of gas mixture to the flame jets.

GIANT BURNER

The Sherman Equal Heat Gas Burner

Patented November 14, 1911—No. 1008741
Design patent March 19, 1912—No. 42339

One advantage claimed is that the flame strikes the utensil squarely and practically covers its bottom with uniform heat, thus avoiding the heat spots or streaks which other burners cause. Every cook is familiar with the warping in center of the frying pan after some use, the result of the old star burners delivering an excess of heat at that point. Frying or broiling evenly is better accomplished by this new design, because of the equal heat distribution. It is claimed that the consumption of gas in this burner is practically perfect, and, from tests made, that there is a considerable saving of fuel as compared with burners of other designs.

As can be seen from the cut, the design is novel and quite pleasing in appearance. It is the invention of practical stove makers and is so designed that it is adaptable to the stove of any manufacturer without a change in the construction of other parts of the stove. The moulding of the burner is facilitated by the circular design as there are no sharp corners of sand to wash away while the metal is being poured. Several stove makers have already adopted the new burner and will equip their stoves with it on a royalty basis.

LING'S FORWARD-DUMPING WHEELBARROW.—Messrs. Miller & Coulson are putting on the market a dumping-wheelbarrow, known as the Ling, which, as will be seen from the cut, could often be advantageously used in gas plants of any sort. The picture shows it in position after discharging its load. Primarily it was constructed as an

aid to concrete work, such as concerns the placing of the mixture on floor slabs, etc., but its use in transporting certain materials in and about a gas plant can readily be perceived. The barrow tray consists of No. 14 sheet steel pressed to shape, with curved edges. The chief frame, and also the handles, are composed of steel tubing, and the apparatus entire differs not greatly in weight from the everyday wheelbarrow. Indeed, at the handles that difference does not exceed 14 pounds lift. The capacity amounts to 3 cubic feet, with the tray level filled. Its price, too, commends it to the contractor or buyer —$7 to $7.50.

Book Reviews.

"*Shale Oils and Tars and Their Products.*"—Dr. W. Scheithauer, translated from the German by Mr. Chas. Salter, published by Scott, Greenwood & Son, London; 183 pages, 5 by 8¼ inches; illustrated; price, $3.50. This work gives a history and a technical description of the Scottish shale oil industry, and of the Thuringian mineral oil production; dealing at length with the processes of production, the properties of the materials derived from their distillation, and the uses to which the finished products are put. It is a good translation of a work that covers the subject.

Items of Interest
FROM VARIOUS LOCALITIES.

THE general balance sheet of that excellently managed corporation, Messrs. J. G. White & Company, for the twelvemonth ended February 28, 1913, shows an actual profit for the year of $846,908, which surely is a creditable showing. Another pretty bright spot is revealed in the figures which prove that the Company's total debt, "of all sorts," is quite a bit less than 50 per cent. of the "Cash in bank and on hand." The exact figures in this respect are: Cash as aforesaid, $474,178; debts, $231,474. The sum transferred to surplus for the twelvemonth was $176,648.

THE Union Gas and Electric Company, of Cincinnati, O., is at last located in suitable quarters for the proper displaying of its gas and electric appliances. A lease, covering a term of years, of the premises, 708 Race street, has been signed. It will take a month or more before the premises will be ready for occupancy; but, when the renovating and conditioning are completed, the Company's commercial headquarters will be one of Cincinnati's showplaces on business account.

MR. C. F. PORTER, Editor, and Mr. John Kendrick Bangs, Contributing Editor to and for the city monthly publication, entitled "Concerning Municipal Ownership," are usually fair-minded men, and writers who generally ponder carefully their subject before expressing their views thereon. However, this time we believe Editor Porter's bang at the city, respecting one of its practices, has a report more loud than reaching, more rapid than convincing. However, here is that which the aforesaid pondered, in the issue for June—the heading thereto being, "A City's Philanthropy:" "New York City's experiment in the municipal operation of the Staten Island Ferry has been costing the taxpayers nearly $1,000,000 annually. It is probable that this loss will be doubled, now that free transfers are to be given from the boats to the surface cars. The arrangement will be satisfactory to residents of Staten Island. To the large body of taxpayers, however, who stop and think that they are paying the bills, it will hardly appeal, for it is unjust to provide the residents of any community with a utility below cost at the expense of those who do not use the service." Well, this would be important, if true; but it isn't true. One of the best investments that New York City ever made was when it purchased the Staten Island ferry system; and one of the best assets to day is "that same system." If Editor Porter will revise or review the assessment maps of the Greater City he will find that, as between the present day and the purchase of the Staten Island ferry system, the assessment valuation of real estate in Richmond county has increased over 100 millions of dollars; and we submit, if the city had not taken over the ferry systems and had failed to operate these on municipal account, the increase would have been nil, for Richmond county was then going back, if any move at all were being manifested. With a tax rate approaching $2 on the hundred over all, the increased valuation would seem worth while. Again, it is our bounden belief that if the Greater City authorities, whose predecessors, through the building of great bridge structures, and tunnel ones as well, while by so doing brought into actual value the lands in outlying sections, nevertheless cut 80 per cent. out of the value of lands and structures lying immediately west of the said tunnels and bridges—lands and structures the values of which were inmeasureably, as to ratio, far above the average values subsequently created by the engineering structures—would purchase and operate the Fulton, Wall, South and Hamilton ferries, that the taxable value increase, in the districts served by the said ferries, would more than return the city a fair profit in the transaction. Like the boys who were stoning the frogs, it was glory and profit to the former owners in Bay Ridge, Flatbush, New Utrecht, New Lots, East New York, Richmond Hill and Jamaica; but how was it, and is it, to the former city owners within a 1½ miles of the water front, from Hunter's Point, on the north, to Red Hook Point, on the south. No; keep up the operation of the Staten Island ferry on municipal account, simply as an item going to help *reduce* the average taxation rate all over the city; and to help good, desirable residents from going over to New Jersey or Connecticut.

AT the annual meeting of the shareholders of the Pawtucket (R. I.) Gas Company, unqualified assent to the ratification of all contracts and agreements, made by the retiring Board of Directors during the twelvemonth, was registered. The annual reports attested to the fact that the Company had enjoyed one of the most prosperous years in its lengthy history. The following Board was then unanimously named: Hon. Fred. W. Easton and Messrs. A. M. Coats, Frank B. Bains, John A. Arnold, Fred. S. Pratt, Kenneth F. Wood, Howard W. Fitz, Steadman Butterick and Fred. P. Royce.

"TALK about hair-splitters—in my opinion," so writes a correspondent in Racine, Wis., "the closest to form in this respect may be found right here, in this fairly up-to-date settlement. Some time ago, in order to facilitate its operations, which facilitation would mean much greater comfort in general to the residents, the Wisconsin Gas and Electric Company applied to the Common Council for a grant from the city vacating a portion of the bed of Second street, so as to allow the Company to keep and maintain a tunnel thereunder, which would greatly aid in the transportation of materials to the generating house, purifying rooms, etc. The Council, having looked the situation over, declared it would agree provided the Company would make a reduction of 5 cents per 1,000 cubic feet in its selling rate. This the Company verbally agreed to do; but the authorities specified that the Company should file a written agreement in the city archives to the effect proposed. The Company declines. So the city remarks, 'You hair splitter;' and the Company, ejaculates, 'You're another.' So there you are!"

THE following officers have been reappointed to manage the affairs of the Binghamton (N. Y.) Gas Company. Directors, H. C. Lathrop, E. M. Stone, Emerson McMillin, Geo. W. Dunn, S. J. Hirschman, J. T. Deyo, Jas. W. Manier, Geo. F. O'Neill and G. W. Phelps; President, A. P. Lathrop; Vice-President and Treasurer, James W. Manier; Secretary and General Manager, C. W. Bennett; Auditor, Jas. Lawrence; Consulting Engineer, H. G. Abell.

MR. J. W. BERTHOLF, since 1907, General Foreman of the Nassau and Suffolk Lighting Company, of Hempstead, N. Y., has resigned from that position. On the 14th inst. he sailed for San Juan, Porto Rico, there to actively join the forces employed by Mr. J. Alex. Mayers, in the construction of the new gas plant for San Juan, and its surroundings.

MR. C. J. DE MERS has been appointed Superintendent of the Standard Gas Company's plant at Matawan and Keyport, N. J. Mr. De Mers was formally on the staff of the Wilmington (Del.) Company.

IN 1912 the surplus earnings of the American Gas Company amounted to $142,000. In the total charged off, the sum of $124,252 was charged off on depreciation account.

THE State Public Utility Commission has approved the issue of $750,000 capital stock of the Public Service Gas Company, of New Jersey.

THE output of the Richmond (Va.) City Gas Works for 1912 (as per Superintendent Knowles' report for 1912) was 604,776,800 cubic feet, which was an increase of 68,618,600 cubic feet over the return for 1911. The increase on ordinary or private consumption was about 14 per cent. The leakage loss was less (11.37 per cent.) this year than last by perhaps 10 per cent., the change for the better naturally following a systematic overhauling of the mains and the milder winter. Meanwhile, the main overhauling is being steadily gone on with. The gross receipts from sales of gas were $484,775.26, and the expenses are returned at $227,979.40, or credit to gain and loss of $256,795.86. To this should be added the value of gas used in the public buildings and street lamps, which amounted to $11,688.82. Charges for superintendence, legal services, interest, redemption and taxes amonnted to $128,378.87, a balance to profit of $140,106.31. Sub-charges, on account of distribution, street lighting, etc., amounted to $37,225.55, left a clear net profit for the year of $102,880.76. The candle power averaged 21.60. The Mayor, in referring to the report, among other things said: "The large annual increase in consumption of gas, the rapid increase of our population, and the apparent probability of a large and sudden demand for gas following annexation, require immediate attention to the Superintendent's recommendation that the city adopt a comprehensive plan for the enlargement of the works, provision of additional holders, and the laying of mains of diameters in locations that will enable the city to take care of future business. Your attention is called to the continued advance in prices and the decrease in the supply of all grades of oil used in gas making. The estimated increase in our oil cost for 1913 is $60,000, which may bring us to the necessity of returning to coal gas. To meet this condition our Superintendent recommends an increase of our coal gas generating capacity to 2,000,000 cubic feet per day."

THE Central Indiana Gas Company, which is one of the Dawes properties, and which serves gas to Muncie, Anderson, Elwood, Marion, Hartford City, Alexandria, Fairmount and points between, last year constructed a coal gas plant in Muncie up to an output per diem of 1,000,000 cubic feet, will at once add another unit of like capacity—both are of the coke oven type. The plant will be completed early in the coming winter.

MR. J. E. SMITH, since 1896 connected with the La Crosse (Wis.) Gas and Electric Company, and for the past two or three years Superintendent of Manufacture and Distribution, severed his connection with the corporation on the 1st inst.

THE tentative plans for the merging of all the gas and electric interests of Louisville, Ky., which are now owned by the Byllesby Corporation, into a concern to be known as the Louisville Gas and Electric Company, are completed. At date of writing these officers had already been appointed: President, General George H. Harries; Vice-President, and General Manager, Donald McDonald. It will be noted that the latter was the party who, some years ago, so stoutly averred that he never would consent to amalgamation of any sort "What! Never!"

THE matter of arranging for a new franchise for the Quincy (Ills.) Gas, Electric and Heating Company came up at a recent session of the City Council. After some debate on the matter, in which Ald. Thompson ventured the remark that the Company was "skinning" the city, and which remark extracted from Mr. J. T. Lynn the statement, "There is not another public utility corporation here that is doing as much for Quincy as we are"—Mr. Lynn's people own the Quincy Company—the matter, on Mr. Lynn's suggestion, was deferred until the Legislature had determined what to do with the Public Utility Bill.

MANAGER H. T. SLOPER, of the New Britain (Conn.) Gas Light Company, has reported to his Directors that the delay of the contractors, under agreement to construct the buildings underway for the corporation, is chargeable to strikes on the part of the mechanics, and he declares that these disagreements will likely put the completion of the structures over to mid-August.

THE hearing on account of the plea of certain petitioners for an order requiring the Bridgeport (Conn.) Gas Light Company to put its selling rate at a lower figure, which was schedule d for the morning of the 5th inst., has been put over by agreement to the morning of the 2d prox.

The St. Louis (Mo.) Board of Assessors has assessed the ratable taxable value of the properties of the Laclede Gas Light Company at $12,412,120, which places the Company at the head of the taxable listings. It is not at all unlikely that the Compa ny will contest this rating, which certainly does look abnormally high.

MISTER TAYLOR CRUM, a resident of North Fargo, N. D., is crumbling with anger over the report of the Commercial Club, which favors the erection of a gasholder up to retaining 40,000 cubic feet of gas, which is to "go up" in a "Thickly populated section of the Fifth ward." Expanding in wrath as he warms to his subject, the aforesaid Crum crumbles in expression to the disintegrating point of calmness. In fact, rising resplendent to the occasion, he asks (referring to the action of the Commercial Club), "By just what right or by what authority these gentlemen assumed to mortgage the rights of this city to control this public service corporation is not clear. The citizens of the Fifth ward think they have a few rights which this corporation should not be permitted to trample under its steel-shod feet!" What ho! My merry men. And, again. * * * "The stock argument of these corporation parasites is that the gas works were there first, hence the people who came afterwards have no right to complain." Well, thou irate Taylor Crum, shall the gas men shoulder their works and walk, or move or "go on?" This discussion and its reference recall to our editorial thought a "trifle" from the immortal Dryden's pen, which, with a little readjusting, may help the crumbler to a greater sense of ease. 'Tis this:

> "Yet lab'ring well his little spot of ground,
> Some scatt'ring potherbs here and there he found;
> Which, cultivated with his daily care,
> And, bruised with vervain, were his daily fare."

So, with Dryden, do we declare that crumblers, and their kidney, need not live near the gas works; again, it is an awfully expensive (in fact virtually impossible) affair to move a gas plant.

THE Ottumwa (Ia.) gas folks are adding 25 per cent. to the length of their distribution system this year.

AT the annual meeting of the Georgetown (D. C.) Gas Light Company the retiring Board of Directors was re-elected, and a dividend of $1.25 per share was declared.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,061,360. Gas Burner. F. J. Doyle, Chicago, Ills.
1,061,266. Gas Generator. H. Gadermayr, Bischoswerda, Germany.
1,061,598. Escaping Gas Alarm. O. Casilli, Newark, N. J.
1,061,659. Mantle Retainer. C. M. Brandt, Holmes, Pa., assignor of 25¼/100 to A. B. Willoughby, Philadelphia.
1,061,738. Lighting Device for Gas Stoves. H. C. Fritz, Cleveland, O., assignor to American Stove Co., St. Louis, Mo.
1,061,811. Gas Burner. A. J. Boynton, Lorain, O.
1,061,812. Mantle Retainer. C. M. Brandt, Holmes, Pa., assignor of 25¼/100 to A. B. Willoughby, Philadelphia, Pa.
1,061,859. Process of Regenerating Iron Oxide Used in Gas Purification. D. McDonald, Louisville, Ky.
1,061,861. Process of Manufacturing Gas. R. Miller, Woodlawn Borough, Pa., assignor, by mesne assignments, to Superior Gas Improvement Co., Pittsburgh, Pa.
1,061,936. Gas Generator. W. Gregson, Fort Worth, Tex., assignor of one-half to J. A. Wisherd, Stanton, Neb.

The Market FOR GAS SECURITIES.

Wall street, bulls and bears, sheep and lambs, ran amuck last week. Reams of securities were burned up; that is, the prices were sent to destruction. In one day 14,500 shares of Consolidated were dealt in, at prices declining from 130 to 122. How values melted. The Minnesota rate decision is announced, and, because State rights were not completely wiped out, the "Street" exclaimed, "All's lost, save"—the hindmost. And then followed the offering down. Then, the end of the week. Friday (to-day, the 13th), comes the news of a great wreck on the N. Y., N. H. & H., in which 5 are killed and a score are injured. *Mirabile dictu!* Up go shares of all sorts; and Consolidated, in the space of 24 hours, registers a gain of 6 points. The opening was 129½ to 130; virtually the closing on the corresponding day last week.

Out-of-town gas shares, dealt in on the Exchange, shared in the vagaries. Brooklyn Union managed to get down to 118¾. To-day it came in at 125 to 127. Peoples, of Chicago (at 7 per cent. per annum) is 107½ to 108; and Laclede common (another 7 per center) is 92 to 93.

The United Gas Improvement Company's regular dividend for the last quarter (2 per cent.) is payable the 15th prox., and the Brooklyn Union Company's, 1½ per cent. quarterly, with an extra of 1, is ex-dividend to-day. A sale of New Amsterdam 5's is reported at 99¾; and 99 is bid for any part of $25,000 thereof. Montreal Light, Heat and Power is 210 bid.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

JUNE 16.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par alue of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$99,816,500	100	129½	130
Central Union Gas Co.—				
1st 5's, due 1927, J. & J.	3,530,000	1,000	101	103
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	105	106
Mutual Gas Co.	3,600,000	100	157	157
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	99	101
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	59	63
1st Mtg. Gold Bds. 5 p. ct.	1,500,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	96	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	100	102
Standard	5,000,000	100	102	104
Preferred	5,000,000	100	90	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	125	127
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	300,650	500	180	—
Out-of-Town Companies.				
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	509,000	1,000	97	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	2,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	85
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed				
Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric				
Co.	29,500,000	100	87	90
Essex and Hudson Gas Co.	6,500,000	—	133	136
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co.,				
1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of				
New Jersey	10,500,000	—	130	133
" Bonds, 5's	10,500,000	—	104	106
Indianapolis	2,000,000	—	7	80
" Bonds, 5's	2,650,000	—	90	93
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co.,				
of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	98½	99
Laclede Gas Co., St. Louis.	10,000,000	100	92	93
Preferred	2,500,000	100	99	102
Bonds	10,000,000	1,000	102¾	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	130	130
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	
Massachusetts Gas Companies, of Boston	25,000,000	100	88¼	88⅜
Preferred	25,000,000	100	88¼	88¾
Montreal L. H.& P., Canada	9,000,000	100	209	212
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	97	98
Bonds, 6's	5,000,000	—	127	128
New Haven Gas Co.	5,000,000	25	189	190
Peoples Gas Lt. & Coke Co.,				
Chicago	25,000,000	100	107⅜	108
1st Mortgage	20,100,000	1,000	103	103¼
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104⅜	105¼
Pacific Gas and Electric Co.	15,500,000	—	42	45
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	96	93
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	106
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	3,447,000	1,000	94	96
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	417½	420
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, Richmond, Va., October 15-17, 1913. Officers: President, W. R. Addicks, New York City. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting Sept. 1913. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, New York City, Oct. 8, 1913. Officers: President, C. G. M. Thomas, Long Island City, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street, New York City.

Gas Meters.—Monthly Section Meetings; Grand Commissioner, I. W. Peffly, New York; Gen'l Sec'y, H. Thurston Owens, La Crosse, Wis.; New York Section, Chairman, Will W. Barnes; Secretary, John M. Brock, 204 Percy street, Flushing, N. Y. Philadelphia Section; Chairman, L. R. Dutton'; Secretary, H. F. Patterson, Jr., 833 Chestnut street. Cleveland Section, Chairman, F. R. Hutchinson; Secretary, Wm. Holtz, East Ohio Gas Co. New England Section, Chairman, F. M. Roberts, Haverhill; Sec., F. K. Wells, 69 Broad street, Boston. Winona Section, Winona, Minn., W. F. Clausen, Chairman.

Guild of Gas Managers of New England.—Annual meeting, March, 1913. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, March 18th and 19th, 1914. Chicago, Ills. Officers: President, W. F. Barrett, Chicago, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

Illuminating Engineering Society.—Annual meeting,———— September, 1913. Meetings of Sections, monthly. Pres., Preston S. Millar; General Secretary, J. D. Israel, 29 W. 39th street, New York City. Sections: New York, Secretary, C. L. Law, 124 West 42d street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, J. B. Jackson, 28 North Market street. Pittsburgh, Secretary, J. C. Mundo, Oliver Building.

Indiana Gas Association.—Annual meeting, March —— —— 1914. Terre Haute. Officers: President, A. S. Cooke, Terre Haute; Vice-President, A. C. Blinn, Evansville; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, May, 1914; ———— Officers: President, B. C. Adams, Lincoln, Neb.; Secretary, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, October—— 1913. ———— Officers: President, L. O. Ripley, Emporia, Kas.; Secretary and Treasurer, W. H. Fellows, Leavenworth, Kas.

Michigan Gas Association—Annual meeting, September, 17, 18, 19, 1913; ———— Officers: President, W. S. Blauvelt, Detroit, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1913; Mexico, Mo. Officers: President, P. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

National Commercial Gas Association.—Annual meeting and gas show, Dec. 1-6, 1913. Philadelphia, Pa. Officers: President, C. W. Hare, Philadelphia Pa.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, St. Louis, Mo., May 19 and 20, 1914; Officers: President, E. L. Brundrett, Kansas City, Mo.; Secy-Treas., T. Clive Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 18th and 19th, 1914, Boston. Officers: President, T. H. Hintze, Providence, R. I.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—Annual Meeting, July —, 1913, Asbury Park N. J. President, C. F. Butcher, Freehold, N. J.; Sec'y-Treasurer, O. F. Potter, Newark, N. J.

Ohio Gas Association.—Annual meeting, February ———, 1913, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary, L. B. Denning, Columbus, O.

Oklahoma Gas, Electric and Railway Association.—Annual meeting, Oklahoma City, May, ——1914. President, F. E. Bowman, Ada; Secretary-Treasurer, H. V. Bozel, Oklahoma City.

Pacific Coast Gas Association.—Annual meeting, San Jose, Cal., September 16, 17, 18, 1913. Officers: President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, Henry Bostwick, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, Allentown, Pa., April ———, 1914; Officers, President, J. A. Frick, Allentown, Pa.; Secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

Society of Gas Lighting.—Annual meeting Dec., 11, 1913; monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city

Southern Gas Association.—Annual meeting, Mobile, Ala., April 4, 1914, Officers: President, James Ferrier, Rome, Ga.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. May———— 1914, Galveston, Tex. Officers: President, G. H. Gifford, Fort Worth Tex.; Secretary H. S. Cooper, 405 Slaughter Bldg., Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May ————1914, Milwaukee, Wis. Officers: President, Ewald Hasse, Milwaukee, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.